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(71) Applicant *(for all designated States except US)*: **ASTRAZENECA UK LIMITED** [GB/GB]; 15 Stanhope Gate, London W1Y 6LN (GB).

(72) Inventors; and

(75) Inventors/Applicants *(for US only)*: **BLOCK, Michael, Howard** [GB/GB]; Alderley Park, Macclesfield, Cheshire SK10 4TG (GB). **DONALD, Samuel, Craig** [GB/GB]; Alderley Park, Macclesfield, Cheshire SK10 4TG (GB). **FOOTE, Kevin** [GB/GB]; Alderley Park, Macclesfield, Cheshire SK10 4TG (GB). **SCHOFIELD, Paul** [GB/GB]; Alderley Park, Macclesfield, Cheshire SK10 4TG (GB). **MARSHAM, Peter, Robert** [GB/GB]; Alderley Park, Macclesfield, Cheshire SK10 4TG (GB).

(74) Agent: **BILL, Kevin**; AstraZeneca, Global Intellectual Property, P.O. Box 272, Mereside, Alderley Park, Macclesfield, Cheshire SK10 4GR (GB).

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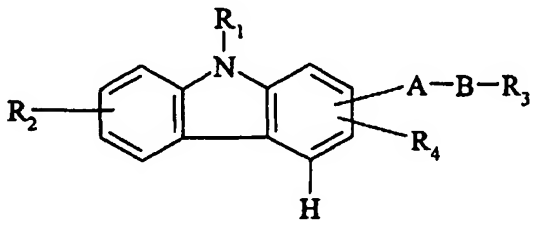

(I)

(57) Abstract: The use of a compound of formula (I) in the manufacture of a medicament for the treatment, in a warm-blooded animal, of disorders mediated by the neuropeptide Y5 receptor wherein R_1, R_2, A, B, R_3 and R_4 are as defined within or a pharmaceutically acceptable salt, prodrug or solvate thereof, is described. Pharmaceutical compositions, methods and processes for preparation of compounds of formula (I) are also described.

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CARBAZOLE DERIVATIVES AND THEIR USE AS NEUROPEPTIDE Y5 RECEPTOR LIGANDS

CHEMICAL COMPOUNDS

This invention relates to compounds which antagonise the interaction between neuropeptide Y (NPY) and the neuropeptide Y5 (NPY-5) receptor sub-type. This invention also relates to processes for the manufacture of NPY-5 receptor antagonists or agonists, pharmaceutically acceptable salts thereof, and to novel pharmaceutical compositions of NPY-5 receptor antagonists or agonists.

NPY is a 36 amino acid polypeptide which is a member of the pancreatic polypeptide family of regulatory peptides with widespread distribution throughout the mammalian system. NPY is the most abundant neuropeptide in the central and peripheral nervous systems and has been shown to have powerful and complex effects on feeding, anxiety, circadian rhythms, reproduction, pituitary-adrenocortical axis function, memory retention, seizures, thermo-regulation, and cardiovascular and gastrointestinal functions. NPY interacts with a heterogeneous population of at least six receptor subtypes, Y_1-Y_6 which activate adenylate cyclase via a G-protein. For reviews of NPY see: CRC Critical Reviews in Neurobiology. (1988) 4, 97-135; Regulatory Peptides (1996) 62, 1-11.

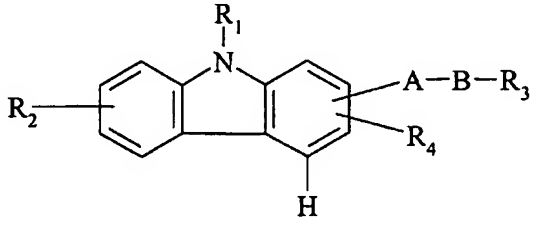
One of the most striking actions of NPY is induction of feeding in a variety of vertebrate species. Direct injection of NPY into the hypothalamus of satiated rats can increase food intake up to 10-fold over a 4 hour period and NPY is the only known peptide which can cause animals to eat until they are obese. Recent studies on NPY have focused on the identification of the NPY receptor responsible for the regulation of feeding. The NPY-5 receptor has been identified as the receptor most closely matching a proposed appetite receptor. The functional role of this receptor was addressed by receptor blockade studies. Intra-cerebro-ventricular injection of NPY-5 receptor antisense oligodeoxynucleotides prevented the increase in hypothalamic NPY levels during food deprivation and inhibited fasting-induced food intake in rats [Schaffhauser et al (1997) Diabetes 46, 1792 - 1798]. Thus the NPY-5 receptor is a potential pharmacological target in the modulation of feeding disorders such as obesity. For reviews on the association between NPY and feeding see: Zimanyi et al (1998) Current Pharm Des 4, 349-66; Heinrichs et al (1998) Vitamins and Hormones 54, 51-66.

Obesity is a large and ever expanding problem in affluent societies, which has reached epidemic proportions. According to the US Institute of Medicine, 59% of Americans are

clinically obese or at least 20% above their ideal body weight. Obesity is associated with susceptibility to a number of other conditions e.g. non-insulin-dependent diabetes, hypertension, dyslipidaemia and coronary heart disease. These conditions lead to reduction in life expectancy and decreased quality of life. The overall financial burden of obesity is difficult to quantify but it has been estimated that in the US it may account for 6-8% of total healthcare expenditure.

Thus there is need for pharmaceutical agents which have efficacy in the treatment of eating disorders such as obesity. Modulation of NPY activity through antagonism at the NPY-5 receptor offers one potential target for pharmacological intervention in these conditions.

According to the first feature of the invention there is provided the use of a compound of formula (I) in the manufacture of a medicament for the treatment, in a warm-blooded animal, of disorders mediated by the neuropeptide Y5 receptor:



(I)

wherein:

R_1 is selected from hydrogen, C_{1-6}alkyl, C_{1-4}alkoxyC_{1-4}alkyl, C_{1-6}alkanoyl, C_{1-4}alkanoylC_{1-4}alkyl, aryl, arylC_{1-4}alkyl, arylC_{1-4}alkoxyC_{1-4}alkyl, arylC_{1-4}alkanoyl, arylcarbonyl, heteroaryl, heteroarylC_{1-4}alkyl, heteroarylC_{1-4}alkoxyC_{1-4}alkyl, heteroarylC_{1-4}alkanoyl, heteroarylcarbonyl, heterocyclyl, heterocyclylC_{1-4}alkyl, heterocyclylC_{1-4}alkoxyC_{1-4}alkyl, heterocyclylC_{1-4}alkanoyl, heterocyclylcarbonyl, carbocyclyl, carbocyclylC_{1-4}alkyl, carbocyclylC_{1-4}alkoxyC_{1-4}alkyl, carbocyclylC_{1-4}alkanoyl, carbocyclylcarbonyl, C_{1-4}alkylsulphonyl, *N,N*-di-C_{1-4}alkylaminosulphonyl or *N*-C_{1-4}alkylaminosulphonyl wherein R_1 may be optionally substituted (on an available carbon atom) by up to three substituents independently selected from C_{1-4}alkyl optionally substituted by up to three fluoro substituents, C_{1-4}alkoxy, C_{1-4}alkanoyl, carboxy, hydroxy, halo, cyano, amino, *N*-C_{1-4}alkylamino, *N,N*-di-C_{1-4}alkylamino, C_{1-4}alkanoylamino, mercapto,

C_{1-4}alkylsulphonyl, C_{1-4}alkylsulphinyl, C_{1-4}alkylsulphanyl, nitro, heteroarylC_{1-4}alkanoylamino, or C_{1-4}alkoxycarbonyl;

$\mathbf{R_2}$ is selected from hydrogen, C_{1-4}alkyl (optionally substituted by hydroxy), C_{1-4}alkoxy, cyano, nitro, halo, amino, *N*-C_{1-4}alkylamino, or *N,N*-di-C_{1-4}alkylamino;

A is selected from, -NH-, -CH_2NH-, -NHC(O)-, -CH_2NHC(O)-, -C(O)NH-, -NHC(O)NH-, -NHC(O)O-, -NHS(O_2)-, -NHC(=N-CN)-, or a direct bond; wherein each nitrogen atom is optionally substituted with C_{1-4}alkyl or hydroxyC_{2-4}alkyl;

B is selected from C_{1-10}alkylene, C_{2-10}alkenylene, C_{2-10}alkynylene, or a direct bond wherein the alkylene, alkenylene and alkynylene chains are optionally substituted by hydroxy, C_{1-4}alkoxy or amino;

$\mathbf{R_3}$ is selected from hydrogen, hydroxy, C_{1-6}alkoxy, C_{1-6}alkanoyl, C_{1-6}alkanoyloxy, C_{1-6}alkanoylamino, C_{1-6}alkoxycarbonyl, aryl, aryloxy, arylcarbonyl, arylC_{1-4}alkyl, arylC_{1-4}alkoxy, arylC_{1-4}alkanoyl, aryloxycarbonyl, arylC_{1-4}alkoxycarbonyl, arylamino, diarylamino, arylsulphonyl, heteroaryl, heteroaryloxy, heteroarylC_{1-4}alkoxy, heteroarylcarbonyl, heteroarylC_{1-4}alkanoyl, heteroaryloxycarbonyl, heteroarylC_{1-4}alkoxycarbonyl, heteroarylC_{1-4}alkyl, heteroarylamino, heteroarylsulphonyl, diheteroarylamino, heterocyclyl, heterocyclyloxy, heterocyclylC_{1-4}alkoxy, heterocyclylcarbonyl, heterocyclylC_{1-4}alkanoyl, heterocyclyloxycarbonyl, heterocyclylC_{1-4}alkoxycarbonyl, heterocyclylC_{1-4}alkyl, heterocyclylamino, diheterocyclylamino, heterocyclylsulphonyl, carbocyclyl, carbocyclyloxy, carbocyclylC_{1-4}alkoxy, carbocyclylcarbonyl, carbocyclylC_{1-4}alkanoyl, carbocyclyloxycarbonyl, carbocyclylC_{1-4}alkoxycarbonyl, carbocyclylC_{1-4}alkyl, carbocyclylamino, carbocyclylsulphonyl, dicarbocyclylamino, cyano, carbamoyl, ureido, amino, *N*-C_{1-4}alkylamino, *N,N*-di-C_{1-4}alkylamino, C_{1-4}alkoxycarbonylamino, carbamoyl, *N*-C_{1-4}alkylcarbamoyl, *N,N*-di-C_{1-4}alkylcarbamoyl, C_{1-4}alkylsulphanyl, C_{1-4}alkylsulphinyl, C_{1-4}alkylsulphonyl, trifluoromethyl or fluoro wherein R_3 may be optionally substituted by up to three substituents independently selected from C_{1-4}alkyl, hydroxyC_{1-4}alkyl, C_{1-4}alkoxy, C_{1-6}alkoxycarbonyl, C_{2-6}alkenyloxycarbonyl, C_{1-4}alkanoyl, C_{1-4}alkanoylamino, C_{1-4}alkanoylthio, oxo, carboxy, hydroxy, halo, cyano, amino, *N*-C_{1-4}alkylamino, *N,N*-di-C_{1-4}alkylamino, *N*-C_{1-4}alkylaminoC_{1-4}alkyl, *N,N*-di-C_{1-4}alkylaminoC_{1-4}alkyl, carbamoyl, *N*-C_{1-4}alkylcarbamoyl, *N,N*-di-C_{1-4}alkylcarbamoyl, mercapto, C_{1-4}alkylsulphonyl,

C_{1-4}alkylsulphinyl, C_{1-4}alkylsulphanyl, C_{1-4}alkylsulphonyloxyC_{1-4}alkyl, nitro, trifluoromethyl, trifluoromethylC_{1-4}alkyl, C_{1-6}alkoxycarbonylamino, C_{1-6}alkoxycarbonyl(N-C_{1-4}alkyl)amino, aryl (optionally substituted by one C_{1-4}alkoxy or sulphamoyl), arylC_{1-4}alkyl, aryloxyC_{1-4}alkyl, arylcarbonyl, heteroaryl, heteroarylC_{1-4}alkyl, heteroaryloxyC_{1-4}alkyl, heteroarylcarbonyl, heterocyclyl, heterocyclylC_{1-4}alkyl, heterocyclyloxyC_{1-4}alkyl, heterocyclylcarbonyl, carbocyclyl, carbocyclylC_{1-4}alkyl, carbocyclyloxyC_{1-4}alkyl or carbocyclylcarbonyl; and

R_4 is selected from hydrogen, C_{1-4}alkyl, halo or nitro;

or a pharmaceutically acceptable salt, prodrug or solvate thereof.

According to a further aspect of the first feature of the invention there is provided a method of treatment, in a warm-blooded animal, of disorders mediated by the neuropeptide Y5 receptor comprising administering a therapeutically effective amount of a compound of formula (I).

According to a further aspect of the first feature of the invention there is provided a pharmaceutical composition comprising a compound of formula (I), or a pharmaceutically acceptable salt, prodrug or solvate thereof, in admixture with a pharmaceutically-acceptable diluent or carrier for the treatment of a warm-blooded animal, in need of treatment of disorders mediated by the neuropeptide Y5 receptor.

To treat disorders mediated by the neuropeptide Y5 receptor neuropeptide Y5 receptor agonists or antagonists can be administered.

According to a further aspect of the first feature of the invention there is provided the use of a compound of formula (I) in the manufacture of a medicament for the treatment of eating disorders in a warm-blooded animal.

Examples of eating disorders include: obesity, bulimia or anorexia. Further examples of eating disorders include: obesity and related disorders, bulimia or anorexia.

Examples of "related disorders" are diabetes, dyslipidaemia, hypertension and sleep disturbances. Preferably "related disorders" refers to diabetes.

According to a further aspect of the first feature of the invention there is provided the use of a compound of formula (I), or a pharmaceutically acceptable salt, prodrug or solvate thereof, in the manufacture of a medicament for the treatment of eating disorders in a warm-blooded animal.

According to another feature of the invention there is provided the use of a compound of formula (I), or a pharmaceutically acceptable salt, prodrug or solvate thereof, in the manufacture of a medicament for promoting weight loss.

According to a further aspect of the first feature of the invention there is provided a method of treatment, in a warm-blooded animal, of eating disorders, comprising administering a therapeutically effective amount of a compound of formula (I).

According to a further aspect of the first feature of the invention there is provided a method of treatment, in a warm-blooded animal, of eating disorders, comprising administering a therapeutically effective amount of a compound of formula (I), or a pharmaceutically acceptable salt, prodrug or solvate thereof.

According to a further aspect of the first feature of the invention there is provided a method of promoting weight loss, comprising administering a therapeutically effective amount of a compound of formula (I), or a pharmaceutically acceptable salt, prodrug or solvate thereof.

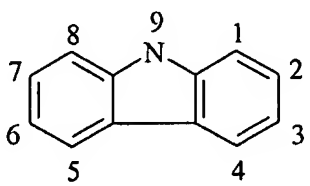
According to a further aspect of the first feature of the invention there is provided a pharmaceutical composition comprising a compound of formula (I), or a pharmaceutically acceptable salt, prodrug or solvate thereof, in admixture with a pharmaceutically acceptable diluent or carrier for the treatment of eating disorders in a warm-blooded animal.

According to a further aspect of the invention there is provided a pharmaceutical composition comprising a compound of formula (I), or a pharmaceutically acceptable salt, prodrug or solvate thereof, in admixture with a pharmaceutically acceptable diluent or carrier for use in promoting weight loss.

Preferably promoting weight loss would refer to promoting weight loss in a warm-bloodied animal.

Preferably a warm-blooded animal is man.

For the avoidance of doubt the numbering of the positions on the carbazole ring is as follows:



In this specification the generic term **"alkyl"** includes both straight-chain and branched-chain alkyl groups. However references to individual alkyl groups such as "propyl" are specific for the straight-chain version only and references to individual branched-chain alkyl groups such as "isopropyl" are specific for the branched-chain version only. An analogous convention applies to other generic terms.

The term **"aryl"** refers to phenyl or naphthyl.

The term **"heteroaryl"** refers to a 4-14 membered aromatic mono, bicyclic or tricyclic ring containing up to 5 heteroatoms independently selected from nitrogen, oxygen or sulphur, linked via ring carbon atoms or ring nitrogen atoms where a bond from a nitrogen is allowed, for example no bond is possible to the nitrogen of a pyridine ring, but a bond is possible through the 1-nitrogen of a pyrazole ring. The term **"heteroaryl"** preferably refers to a 4-10 membered aromatic mono or bicyclic ring containing up to 5 heteroatoms independently selected from nitrogen, oxygen or sulphur, linked via ring carbon atoms or ring nitrogen atoms where a bond from a nitrogen is allowed, for example no bond is possible to the nitrogen of a pyridine ring, but a bond is possible through the 1-nitrogen of a pyrazole ring. The term **"heteroaryl"** particularly refers to a 5-10 membered aromatic mono or bicyclic ring containing up to 5 heteroatoms independently selected from nitrogen, oxygen or sulphur, linked via ring carbon atoms or ring nitrogen atoms where a bond from a nitrogen is allowed, for example no bond is possible to the nitrogen of a pyridine ring, but a bond is possible through the 1-nitrogen of a pyrazole ring. More preferably, the term **"heteroaryl"** refers to a 5 or 6 membered aromatic mono or bicyclic ring containing up to 5 heteroatoms independently selected from nitrogen, oxygen or sulphur, linked via ring carbon atoms or ring nitrogen atoms where a bond from a nitrogen is allowed, for example no bond is possible to the nitrogen of a pyridine ring, but a bond is possible through the 1-nitrogen of a pyrazole ring. Examples of 5- or 6-membered heteroaryl ring systems include pyrrole, furan, imidazole, triazole, tetrazole, pyrazine, pyrimidine, pyridazine, pyridine, isoxazole, oxazole, 1,2,4 oxadiazole, isothiazole, thiazole, 1,2,4-triazole and thiophene. Particular examples of 5- or 6-membered heteroaryl ring systems include pyrrole, furan, imidazole, triazole, pyrazine, pyrimidine, pyridazine, pyridine, isoxazole, oxazole, 1,2,4 oxadiazole, isothiazole, thiazole and thiophene. More particularly, the term **"heteroaryl"** refers to a 9 or 10 membered aromatic mono or bicyclic ring containing up to 5 heteroatoms independently selected from

nitrogen, oxygen or sulphur, linked via ring carbon atoms or ring nitrogen atoms where a bond from a nitrogen is allowed, for example no bond is possible to the nitrogen of a pyridine ring, but a bond is possible through the 1-nitrogen of a pyrazole ring. A 9 or 10 membered bicyclic heteroaryl ring system is an aromatic bicyclic ring system comprising a 6-membered ring fused to either a 5 membered ring or another 6 membered ring. Examples of 5/6 and 6/6 bicyclic ring systems include benzofuran, benzimidazole, benzthiophene, benzthiazole, benzisothiazole, benzoxazole, benzisoxazole, 1,3-benzodioxole, indole, pyridoimidazole, pyrimidoimidazole, quinoline, isoquinoline, quinoxaline, quinazoline, phthalazine, cinnoline and naphthyridine. Particular examples of 5/6 and 6/6 bicyclic ring systems include benzofuran, benzimidazole, benzthiophene, benzthiazole, benzisothiazole, benzoxazole, benzisoxazole, indole, pyridoimidazole, pyrimidoimidazole, quinoline, isoquinoline, quinoxaline, quinazoline, phthalazine, cinnoline and naphthyridine.

The term **"heterocyclyl"** refers to a 5-10 membered saturated or partially saturated mono or bicyclic ring containing up to 5 heteroatoms selected from nitrogen, oxygen or sulphur linked via ring carbon atoms or ring nitrogen atoms. Examples of 'heterocyclyl' include tetrahydrofuranyl, 2,3-dihydro-4H-pyran, pyrrolinyl, pyrrolidinyl, 1,3-thiazolidine, morpholinyl, piperidinyl, piperazinyl, dihydropyridinyl, dihydropyrimidinyl and azepane. Particular examples of 'heterocyclyl' include pyrrolinyl, pyrrolidinyl, morpholinyl, piperidinyl, piperazinyl, dihydropyridinyl and dihydropyrimidinyl.

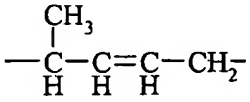
A **"nitrogen linked heteroring"** is a 5-10 membered saturated, partially saturated or totally saturated mono or bicyclic ring containing at least one nitrogen atom, the heteroring being linked through this nitrogen, and 0 to 4 further heteroatoms selected from nitrogen, oxygen or sulphur. Note **"nitrogen linked heteroring"** only includes such heterorings where a bond from a nitrogen is allowed, for example no bond is possible to the nitrogen of a pyridine ring, but a bond is possible through the 1-nitrogen of a pyrazole ring. Examples of "nitrogen linked heteroring" are piperidin-1-yl, morpholino, piperazin-1-yl, pyrrolidin-1-yl, pyrazolin-1-yl, thiomorpholino, benzimidazol-1-yl and isoindol-2-yl. Preferably "nitrogen linked heteroring" refers to piperidin-1-yl, morpholino, piperazin-1-yl or pyrrolidin-1-yl.

The term **"carbocyclyl"** refers to a totally saturated or partially saturated mono, bi or tri cyclic 3-10 membered carbon ring. Particularly the term **"carbocyclyl"** refers to a totally saturated or partially saturated mono, bi or tri cyclic carbon ring. Examples of carbocyclic

rings are cyclopropyl, cyclobutyl, cyclopentyl, cyclohexyl, bicyclo-octane, adamantyl or 2,3-dihydroindene. Particular examples of carbocyclic rings are cyclopentyl, cyclohexyl, bicyclo-octane or adamantyl.

The term **"halo"** refers to fluoro, chloro, bromo or iodo.

Examples of **C_{1-6}alkyl** include methyl, ethyl, propyl, isopropyl, *sec*-butyl and *tert*-butyl; examples of **C_{1-4}alkoxy** include methoxy, ethoxy and propoxy; examples of **C_{1-4}alkoxyC_{1-4}alkyl** include butyloxyethyl and methoxymethyl; examples of **C_{1-4}alkoxycarbonyl** include methoxycarbonyl, *tert*-butoxycarbonyl, ethoxycarbonyl and propoxycarbonyl; examples of **C_{1-4}alkoxycarbonylamino** include methoxycarbonylamino and *tert*-butoxycarbonylamino; an example of **C_{2-6}alkenyloxycarbonyl** is 2-propenyloxycarbonyl; examples of **C_{1-6}alkanoyl** include formyl, acetyl and propionyl; an example of **C_{1-6}alkanoyloxy** is acetoxy; an example of **C_{1-4}alkanoylthio** is acetylthio; examples of ***N*-C_{1-4}alkylamino** include *N*-methylamino, *N*-ethylamino, *N*-propylamino, *N*-isopropylamino, *N*-*sec*-butylamino and *N*-*tert*-butylamino; examples of ***N,N*-di-C_{1-4}alkylamino** include *N,N*-dimethylamino, *N,N*-diethylamino and *N*-ethyl-*N*-methylamino; examples of ***N*-C_{1-4}alkylaminoC_{1-4}alkyl** include *N*-methylaminomethyl and *N*-ethylaminoethyl; examples of ***N,N*-di-C_{1-4}alkylaminoC_{1-4}alkyl** include *N,N*-dimethylaminomethyl and *N*-methyl-*N*-ethylaminomethyl; an example of ***N*-alkylaminocarbonyl** is *N*-methylaminocarbonyl; an example of ***N,N*-dialkylaminocarbonyl** is *N,N*-dimethylaminocarbonyl; an example of ***N*-alkylcarbamoyl** is *N*-methylcarbamoyl; an example of ***N,N*-dialkylcarbamoyl** is *N,N*-dimethylcarbamoyl; examples of **C_{1-4}alkylsulphonyl** include mesyl and butylsulphonyl; examples of **C_{1-4}alkylsulphanyl** include methylsulphanyl and propylsulphanyl; examples of **C_{1-4}alkylsulphinyl** include methylsulphinyl and butylsulphinyl; an example of ***N*-C_{1-4}alkylaminosulphonyl** is *N*-methylaminosulphonyl; an example of ***N,N*-C_{1-4}alkylaminosulphonyl** is *N,N*-dimethylaminosulphonyl; examples of **C_{1-10}alkylene** include methylene and ethylene; examples of **C_{2-10}alkenylene** include 2-propenylene, 2-butenylene,



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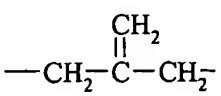

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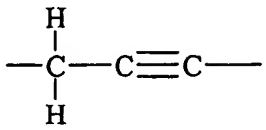
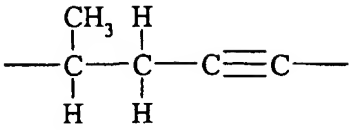
examples of **C_{2-10}alkynylene** include:

 and  ;

examples of **arylC_{1-4}alkyl** include benzyl and phenethyl; an example of **aryloxy** is phenoxy; an example of **arylC_{1-4}alkoxy** is benzyloxy; an example of **arylcarbonyl** is benzoyl; an example of **heteroarylalkanoylamino** is 3-pyridin-4-yl-propanamido.

A suitable pharmaceutically-acceptable salt of a compound of formula **(I)** is, for example, an acid-addition salt of a carbazole derivative of the invention which is sufficiently basic, for example, an acid-addition salt with, for example, an inorganic or organic acid, for example hydrochloric, hydrobromic, sulphuric, phosphoric, trifluoroacetic, citric or maleic acid. In addition a suitable pharmaceutically-acceptable salt of a carbazole derivative of the invention which is sufficiently acidic is an alkali metal salt, for example a sodium or potassium salt, an alkaline earth metal salt, for example a calcium or magnesium salt, an ammonium salt or a salt with an organic base which affords a physiologically acceptable cation, for example a salt with methylamine, dimethylamine, trimethylamine, piperidine, morpholine or tris-(2-hydroxyethyl)amine.

The compounds of the formula **(I)** may be administered in the form of a prodrug which is broken down in the human or animal body to give a compound of the formula **(I)**. Examples of prodrugs include *in vivo* hydrolysable esters of a compound of the formula **(I)**.

Various forms of prodrugs are known in the art. For examples of such prodrug derivatives, see:

a) Design of Prodrugs, edited by H. Bundgaard, (Elsevier, 1985) and Methods in Enzymology, Vol. 42, p. 309-396, edited by K. Widder, *et al.* (Academic Press, 1985);

b) A Textbook of Drug Design and Development, edited by Krogsgaard-Larsen and H. Bundgaard, Chapter 5 "Design and Application of Prodrugs", by H. Bundgaard p. 113-191 (1991);

c) H. Bundgaard, Advanced Drug Delivery Reviews, 8, 1-38 (1992);

d) H. Bundgaard, *et al.*, Journal of Pharmaceutical Sciences, 77, 285 (1988); and

e) N. Kakeya, *et al.*, Chem Pharm Bull, 32, 692 (1984).

An *in vivo* hydrolysable ester of a compound of the formula **(I)** containing a carboxy

or a hydroxy group is, for example, a pharmaceutically-acceptable ester which is hydrolysed in the human or animal body to produce the parent acid or alcohol. Suitable pharmaceutically-acceptable esters for carboxy include C_{1-6}alkoxymethyl esters for example methoxymethyl, C_{1-6}alkanoyloxymethyl esters for example pivaloyloxymethyl, phthalidyl esters, C_{3-8}cycloalkoxycarbonyloxyC_{1-6}alkyl esters for example 1-cyclohexylcarbonyloxyethyl; 1,3-dioxolen-2-onylmethyl esters, for example 5-methyl-1,3-dioxolen-2-onylmethyl; and C_{1-6}alkoxycarbonyloxyethyl esters for example 1-methoxycarbonyloxyethyl and may be formed at any carboxy group in the compounds of this invention.

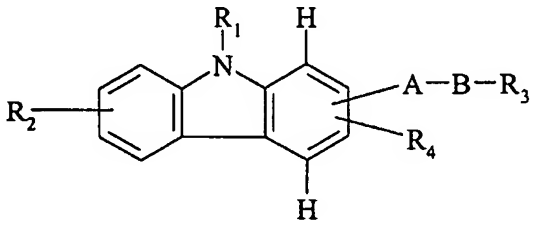
An *in vivo* hydrolysable ester of a compound of the formula **(I)** containing a hydroxy group includes inorganic esters such as phosphate esters (including phosphoramidic cyclic esters) and α-acyloxyalkyl ethers and related compounds which as a result of the *in vivo* hydrolysis of the ester breakdown to give the parent hydroxy group/s. Examples of α-acyloxyalkyl ethers include acetoxymethoxy and 2,2-dimethylpropionyloxy-methoxy. A selection of *in vivo* hydrolysable ester forming groups for hydroxy include alkanoyl, benzoyl, phenylacetyl and substituted benzoyl and phenylacetyl, alkoxycarbonyl (to give alkyl carbonate esters), dialkylcarbamoyl and *N*-(dialkylaminoethyl)-*N*-alkylcarbamoyl (to give carbamates), dialkylaminoacetyl and carboxyacetyl. Examples of substituents on benzoyl include morpholino and piperazino linked from a ring nitrogen atom via a methylene group to the 3- or 4- position of the benzoyl ring.

It is to be understood that, insofar as certain of the compounds of formula **(I)** defined above may exist in optically active or racemic forms by virtue of one or more asymmetric carbon atoms, the invention includes in its definition any such optically active or racemic form which possesses the property of being an agonist or antagonist at the neuropeptide Y5 receptor. The synthesis of optically active forms may be carried out by standard techniques of organic chemistry well known in the art, for example by synthesis from optically active starting materials or by resolution of a racemic form. Similarly, binding to the neuropeptide Y5 receptor may be evaluated using the standard laboratory techniques referred to hereinafter.

The invention also relates to any and all tautomeric forms of the compounds of the formula **(I)** that possess neuropeptide Y5 receptor agonist or antagonist activity.

It will also be understood that certain compounds of the present invention may exist in solvated, for example hydrated, as well as unsolvated forms. It is to be understood that the present invention encompasses all such solvated forms which possess the property of interacting with the neuropeptide Y5 receptor.

According to another first feature of the invention there is provided the use of a compound of formula (**I'**) in the manufacture of a medicament for the treatment, in a warm-blooded animal, of disorders mediated by the neuropeptide Y5 receptor:



(**I'**)

wherein:

$\mathbf{R_1}$ is selected from hydrogen, C_{1-6}alkyl, C_{1-4}alkoxyC_{1-4}alkyl, C_{1-6}alkanoyl, C_{1-4}alkanoylC_{1-4}alkyl, aryl, arylC_{1-4}alkyl, arylC_{1-4}alkoxyC_{1-4}alkyl, arylC_{1-4}alkanoyl, arylcarbonyl, heteroaryl, heteroarylC_{1-4}alkyl, heteroarylC_{1-4}alkoxyC_{1-4}alkyl, heteroarylC_{1-4}alkanoyl, heteroarylcarbonyl, heterocyclyl, heterocyclylC_{1-4}alkyl, heterocyclylC_{1-4}alkoxyC_{1-4}alkyl, heterocyclylC_{1-4}alkanoyl, heterocyclylcarbonyl, carbocyclyl, carbocyclylC_{1-4}alkyl, carbocyclylC_{1-4}alkoxyC_{1-4}alkyl, carbocyclylC_{1-4}alkanoyl, carbocyclylcarbonyl, cyanoC_{1-4}alkyl, aminoC_{1-4}alkyl, *N*-C_{1-4}alkylaminoC_{1-4}alkyl, or *N,N*-di-C_{1-4}alkylaminoC_{1-4}alkyl; wherein R_1 may be optionally substituted (on an available carbon atom) by up to three substituents independently selected from: C_{1-4}alkyl, C_{1-4}alkoxy, C_{1-4}alkanoyl, carboxy, hydroxy, halo, cyano, amino, *N*-C_{1-4}alkylamino, *N,N*-di-C_{1-4}alkylamino, C_{1-4}alkanoylamino, mercapto, C_{1-4}alkylsulphonyl, C_{1-4}alkylsulphinyl, C_{1-4}alkylsulphanyl, nitro, trifluoromethyl-C_{1-4}alkyl, heteroarylC_{1-4}alkanoylamino, or C_{1-4}alkoxycarbonyl;

$\mathbf{R_2}$ is selected from hydrogen, C_{1-4}alkyl, C_{1-4}alkoxy, cyano, nitro, halo, amino, *N*-C_{1-4}alkylamino, or *N,N*-di-C_{1-4}alkylamino;

A is selected from, -NH-, -CH_2NH-, -NHC(O)-, -CH_2NHC(O)-, -C(O)NH-, -NHC(O)NH-, -NHC(O)O-, -NHS(O_2)-, or a direct bond; wherein each nitrogen atom is optionally substituted with C_{1-4}alkyl;

B is C_{1-6}alkylene, C_{2-6}alkenylene, C_{2-6}alkynylene, or a direct bond;

$\mathbf{R_3}$ is hydrogen, C_{1-6}alkoxy, C_{1-6}alkanoyl, C_{1-6}alkoxycarbonyl, aryl, aryloxy, arylC_{1-4}alkoxy, arylcarbonyl, aryl$_{1-4}$alkanoyl, aryloxycarbonyl, arylC_{1-4}alkoxycarbonyl, heteroaryl, heteroaryloxy, heteroarylC_{1-4}alkoxy, heteroarylcarbonyl, heteroarylC_{1-4}alkanoyl, heteroaryloxycarbonyl, heteroarylC_{1-4}alkoxycarbonyl, heterocyclyl, heterocyclyloxy, heterocyclylC_{1-4}alkoxy, heterocyclylcarbonyl, heterocyclylC_{1-4}alkanoyl, heterocyclyloxycarbonyl, heterocyclylC_{1-4}alkoxycarbonyl, carbocyclyl, carbocyclyloxy, carbocyclylC_{1-4}alkoxy, carbocyclylcarbonyl, carbocyclylC_{1-4}alkanoyl, carbocyclyloxycarbonyl, carbocyclylC_{1-4}alkoxycarbonyl, amino, *N*-C_{1-4}alkylamino, *N,N*-di-C_{1-4}alkylamino, C_{1-4}alkylthio wherein R_3 may be optionally substituted (on an available carbon atom) by up to three substituents independently selected from C_{1-4}alkyl, C_{1-4}alkoxy, C_{1-4}alkanoyl, carboxy, hydroxy, halo, cyano, amino, *N*-C_{1-4}alkylamino, *N,N*-di-C_{1-4}alkylamino, C_{1-4}alkanoylamino, mercapto, C_{1-4}alkylsulphonyl, C_{1-4}alkylsulphinyl, C_{1-4}alkylsulphanyl, nitro, trifluoromethylC_{1-4}alkyl, phenyl, C_{1-4}alkoxyphenyl, heteroaryl, heteroarylC_{1-4}alkyl, aminosulphonylphenyl or C_{1-4}alkoxycarbonyl; and

$\mathbf{R_4}$ is hydrogen, C_{1-4}alkyl, or nitro;

or a pharmaceutically acceptable salt, prodrug or solvate thereof.

According to an alternative first feature of the invention there is provided the use of a compound of formula **(I')** (as depicted above) in the manufacture of a medicament for the treatment, in a warm-blooded animal, of disorders mediated by the neuropeptide Y5 receptor wherein:

$\mathbf{R_1}$ is selected from hydrogen, C_{1-6}alkyl, C_{1-4}alkoxyC_{1-4}alkyl, C_{1-6}alkanoyl, C_{1-4}alkanoylC_{1-4}alkyl, aryl, arylC_{1-4}alkyl, arylC_{1-4}alkoxyC_{1-4}alkyl, arylC_{1-4}alkanoyl, arylcarbonyl, heteroaryl, heteroarylC_{1-4}alkyl, heteroarylC_{1-4}alkoxyC_{1-4}alkyl, heteroarylC_{1-4}alkanoyl, heteroarylcarbonyl, heterocyclyl, heterocyclylC_{1-4}alkyl, heterocyclylC_{1-4}alkoxyC_{1-4}alkyl, heterocyclylC_{1-4}alkanoyl, heterocyclylcarbonyl, carbocyclyl, carbocyclylC_{1-4}alkyl, carbocyclylC_{1-4}alkoxyC_{1-4}alkyl, carbocyclylC_{1-4}alkanoyl, carbocyclylcarbonyl, cyanoC_{1-4}alkyl, aminoC_{1-4}alkyl, *N*-C_{1-4}alkylaminoC_{1-4}alkyl, or *N,N*-di-C_{1-4}alkylaminoC_{1-4}alkyl; wherein R_1 may be optionally substituted (on an available carbon atom) by up to three substituents independently selected from: C_{1-4}alkyl, C_{1-4}alkoxy, C_{1-4}alkanoyl, carboxy, hydroxy, halo, cyano, amino, *N*-C_{1-4}alkylamino, *N,N*-di-C_{1-4}alkylamino,

C_{1-4}alkanoylamino, mercapto, C_{1-4}alkylsulphonyl, C_{1-4}alkylsulphinyl, C_{1-4}alkylsulphanyl, nitro, trifluoromethyl-C_{1-4}alkyl, heteroarylC_{1-4}alkanoylamino, or C_{1-4}alkoxycarbonyl;

$\mathbf{R_2}$ is selected from hydrogen, C_{1-4}alkyl, C_{1-4}alkoxy, cyano, nitro, halo, amino, *N*-C_{1-4}alkylamino, or *N,N*-di-C_{1-4}alkylamino;

A is selected from, -NH-, -CH_2NH-, -NHC(O)-, -CH_2NHC(O)-, -C(O)NH-, -NHC(O)NH-, -NHC(O)O-, -NHS(O_2)-, or a direct bond; wherein each nitrogen atom is optionally substituted with C_{1-4}alkyl;

B is C_{1-6}alkylene, C_{2-6}alkenylene, C_{2-6}alkynylene, or a direct bond;

$\mathbf{R_3}$ is hydrogen, C_{1-6}alkoxy, C_{1-6}alkanoyl, C_{1-6}alkoxycarbonyl, aryl, aryloxy, arylC_{1-4}alkoxy, arylcarbonyl, aryl$_{1-4}$alkanoyl, aryloxycarbonyl, arylC_{1-4}alkoxycarbonyl, heteroaryl, heteroaryloxy, heteroarylC_{1-4}alkoxy, heteroarylcarbonyl, heteroarylC_{1-4}alkanoyl, heteroaryloxycarbonyl, heteroaryl-C_{1-4}alkoxycarbonyl, heterocyclyl, heterocyclyloxy, heterocyclylC_{1-4}alkoxy, heterocyclylcarbonyl, heterocyclylC_{1-4}alkanoyl, heterocyclyloxycarbonyl, heterocyclylC_{1-4}alkoxycarbonyl, carbocyclyl, carbocyclyloxy, carbocyclylC_{1-4}alkoxy, carbocyclylcarbonyl, carbocyclylC_{1-4}alkanoyl, carbocyclyloxycarbonyl, carbocyclylC_{1-4}alkoxycarbonyl, amino, *N*-C_{1-4}alkylamino, *N,N*-di-C_{1-4}alkylamino, C_{1-4}alkylthio or fluoro wherein R_3 may be optionally substituted on an available carbon atom) by up to three substituents independently selected from C_{1-4}alkyl, C_{1-4}alkoxy, C_{1-4}alkanoyl, carboxy, hydroxy, halo, cyano, amino, *N*-C_{1-4}alkylamino, *N,N*-di-C_{1-4}alkylamino, C_{1-4}alkanoylamino, mercapto, C_{1-4}alkylsulphonyl, C_{1-4}alkylsulphinyl, C_{1-4}alkylsulphanyl, nitro, trifluoromethylC_{1-4}alkyl, phenyl, C_{1-4}alkoxyphenyl, heteroaryl, heteroarylC_{1-4}alkyl, aminosulphonylphenyl or C_{1-4}alkoxycarbonyl; and

$\mathbf{R_4}$ is hydrogen, C_{1-4}alkyl, or nitro;

or a pharmaceutically acceptable salt, prodrug or solvate thereof.

According to a further alternative first feature of the invention there is provided the use of a compound of formula **(I)** as depicted above in the manufacture of a medicament for the treatment, in a warm-blooded animal, of disorders mediated by the neuropeptide Y5 receptor wherein:

$\mathbf{R_1}$ is selected from hydrogen, C_{1-6}alkyl, C_{1-4}alkoxyC_{1-4}alkyl, C_{1-6}alkanoyl, C_{1-4}alkanoylC_{1-4}alkyl, aryl, arylC_{1-4}alkyl, arylC_{1-4}alkoxyC_{1-4}alkyl, arylC_{1-4}alkanoyl, arylcarbonyl, heteroaryl, heteroarylC_{1-4}alkyl, heteroarylC_{1-4}alkoxyC_{1-4}alkyl,

heteroarylC_{1-4}alkanoyl, heteroarylcarbonyl, heterocyclyl, heterocyclylC_{1-4}alkyl, heterocyclylC_{1-4}alkoxyC_{1-4}alkyl, heterocyclylC_{1-4}alkanoyl, heterocyclylcarbonyl, carbocyclyl, carbocyclylC_{1-4}alkyl, carbocyclylC_{1-4}alkoxyC_{1-4}alkyl, carbocyclylC_{1-4}alkanoyl, carbocyclylcarbonyl, C_{1-4}alkylsulphonyl, *N,N*-di-C_{1-4}alkylaminosulphonyl or *N*-C_{1-4}alkylaminosulphonyl wherein R_1 may be optionally substituted (on an available carbon atom) by up to three substituents independently selected from C_{1-4}alkyl optionally substituted by up to three fluoro substituents, C_{1-4}alkoxy, C_{1-4}alkanoyl, carboxy, hydroxy, halo, cyano, amino, *N*-C_{1-4}alkylamino, *N,N*-di-C_{1-4}alkylamino, C_{1-4}alkanoylamino, mercapto, C_{1-4}alkylsulphonyl, C_{1-4}alkylsulphinyl, C_{1-4}alkylsulphanyl, nitro, heteroarylC_{1-4}alkanoylamino, or C_{1-4}alkoxycarbonyl;

A is selected from, -NH-, -CH_2NH-, -NHC(O)-, -CH_2NHC(O)-, -C(O)NH-, -NHC(O)NH-, -NHC(O)O-, -NHS(O_2)-, or a direct bond; wherein each nitrogen atom is optionally substituted with C_{1-4}alkyl or hydroxyC_{2-4}alkyl;

B is C_{1-10}alkylene, C_{2-10}alkenylene, C_{2-10}alkynylene, or a direct bond wherein the alkylene, alkenylene and alkynylene chains are optionally substituted by hydroxy, C_{1-4}alkoxy or amino;

$\mathbf{R_3}$ is hydrogen, hydroxy, C_{1-6}alkoxy, C_{1-6}alkanoyl, C_{1-6}alkanoyloxy, C_{1-6}alkanoylamino, C_{1-6}alkoxycarbonyl, C_{1-4}alkoxycarbonylamino, aryl, aryloxy, arylcarbonyl, arylC_{1-4}alkyl, arylC_{1-4}alkoxy, arylC_{1-4}alkanoyl, aryloxycarbonyl, arylC_{1-4}alkoxycarbonyl, arylamino, heteroaryl, heteroaryloxy, heteroarylC_{1-4}alkoxy, heteroarylcarbonyl, heteroarylC_{1-4}alkanoyl, heteroaryloxycarbonyl, heteroarylC_{1-4}alkoxycarbonyl, heterocyclyl, heterocyclyloxy, heterocyclylC_{1-4}alkoxy, heterocyclylcarbonyl, heterocyclylC_{1-4}alkanoyl, heterocyclyloxycarbonyl, heterocyclylC_{1-4}alkoxycarbonyl, carbocyclyl, carbocyclyloxy, carbocyclylC_{1-4}alkoxy, carbocyclylcarbonyl, carbocyclylC_{1-4}alkanoyl, carbocyclyloxycarbonyl, carbocyclylC_{1-4}alkoxycarbonyl, cyano, carbamoyl, ureido, amino, *N*-C_{1-4}alkylamino, *N,N*-di-C_{1-4}alkylamino, C_{1-4}alkoxycarbonylamino, aminocarbonyl, *N*-C_{1-4}alkylaminocarbonyl, *N,N*-di-C_{1-4}alkylaminocarbonyl, C_{1-4}alkylthio, trifluoromethyl or fluoro wherein R_3 may be optionally substituted by up to three substituents independently selected from C_{1-4}alkyl, hydroxyC_{1-4}alkyl, C_{1-4}alkoxy, C_{1-6}alkoxycarbonyl, C_{1-6}alkenyloxycarbonyl, C_{1-4}alkanoyl, C_{1-4}alkanoylamino, C_{1-4}alkanoylthio, oxo, carboxy, hydroxy, halo, cyano, amino, *N*-C_{1-4}alkylamino, *N,N*-di-C_{1-4}alkylamino,

N-C_{1-4}alkylaminoC_{1-4}alkyl, *N,N*-di-C_{1-4}alkylaminoC_{1-4}alkyl, aminocarbonyl, *N*-C_{1-4}alkylaminocarbonyl, *N,N*-di-C_{1-4}alkylaminocarbonyl, mercapto, C_{1-4}alkylsulphonyl, C_{1-4}alkylsulphinyl, C_{1-4}alkylsulphanyl, nitro, trifluoromethyl, trifluoromethylC_{1-4}alkyl, aryl, arylC_{1-4}alkyl, aryloxyC_{1-4}alkyl, C_{1-4}alkoxyphenyl, heteroaryl, heteroarylC_{1-4}alkyl, heterocyclylcarbonyl, or aminosulphonylphenyl; and

R_4 is hydrogen, C_{1-4}alkyl, halo or nitro;

or a pharmaceutically acceptable salt, prodrug or solvate thereof.

Preferred values of R^1, R^2, R^3, R^4, A and B are as follows. Such values may be used where appropriate with any of the definitions, claims or embodiments defined hereinbefore or hereinafter.

Preferably R_1 is C_{1-6}alkyl, C_{1-4}alkylsulphonyl, C_{1-6}alkanoyl, *N,N*-di-C_{1-4}alkylaminosulphonyl, *N*-C_{1-4}alkylaminosulphonyl or arylcarbonyl.

Most preferably R_1 is C_{1-4}alkyl, C_{1-4}alkanoyl, C_{1-2}alkylsulphonyl or *N,N*-di-C_{1-2}alkylaminosulphonyl.

In another aspect of the invention, preferably R_1 is hydrogen, C_{1-6}alkyl, C_{1-6}alkanoyl, aryl, arylC_{1-4}alkyl, arylC_{1-4}alkanoyl, arylcarbonyl, heteroaryl, heteroarylC_{1-4}alkyl, heteroarylC_{1-4}alkanoyl, heteroarylcarbonyl, heterocyclyl, heterocyclylC_{1-4}alkyl, heterocyclylC_{1-4}alkanoyl, or heterocyclylcarbonyl.

In another aspect of the invention, most preferably R_1 is ethyl or 4-pyridinylpropanoyl.

In a further aspect of the invention, preferably R_1 is selected from hydrogen, C_{1-6}alkyl, C_{1-6}alkanoyl, aryl, arylcarbonyl, heterocyclylC_{1-4}alkyl, C_{1-4}alkylsulphonyl or *N,N*-di-C_{1-4}alkylaminosulphonyl wherein R_1 may be optionally substituted (on an available carbon atom) by up to three substituents independently selected from halo or heteroarylC_{1-4}alkanoylamino.

In a further aspect of the invention, more preferably R_1 is selected from hydrogen, methyl, ethyl, *n*-propyl, *i*-propyl, acetyl, mesyl, *N,N*-dimethylaminosulphonyl, pyrrolidin-1-ylmethyl, (2-piperidin-4-ylethylaminocarbonyl)phenyl, benzoyl or 2,2,2-trifluoroethyl.

In a further aspect of the invention, particularly R_1 is selected from ethyl, *i*-propyl, acetyl, mesyl or 2,2,2-trifluoroethyl.

Preferably R_2 is: hydrogen or C_{1-4}alkyl.

Most preferably R_2 is hydrogen.

In a further aspect of the invention, preferably R_2 is selected from hydrogen, C_{1-4}alkyl (optionally substituted by hydroxy), cyano or halo.

In a further aspect of the invention, more preferably R_2 is selected from hydrogen, hydroxymethyl, cyano, fluoro, chloro or bromo.

In a further aspect of the invention, particularly R_2 is selected from hydrogen, hydroxymethyl, fluoro, chloro or bromo.

In a further aspect of the invention, particularly R_2 is selected from hydrogen, 6-hydroxymethyl, 6-fluoro, 6-chloro or 6-bromo.

In a further aspect of the invention, particularly preferred R_2 is selected from 6-fluoro.

Preferably A is -NHC(O)-, -NHC(O)NH-, -NHC(O)N(C_{1-4}alkyl)-, -NHC(O)O-, -$NHS(O)_2$-.

Most preferably A is: -NHC(O)O-, -NHC(O)N(C_2H_5)-, -NHC(O)N(CH_3)-, or -NHC(O)-.

In another aspect of the invention most preferably A is: -NHC(O)O-, -NHC(O)N(C_2H_5)- or -NHC(O)-.

In another aspect of the invention preferably A is selected from -NH-, -CH_2NH-, -CH_2NMe-,-NHC(O)-, -NMeC(O)-,-CH_2NHC(O)-, -C(O)NH-, -NHC(O)NH-, -NHC(O)NMe-, -NHC(O)O-, -$NHS(O_2)$-, -NHC(=N-CN)-, or a direct bond; wherein each nitrogen atom is optionally substituted with C_{1-4}alkyl or hydroxyC_{2-4}alkyl.

In another aspect of the invention more preferably A is selected from -NH-, -NHC(O)-, -NHC(O)NH-, -NHC(O)NMe- or a direct bond.

Preferably A is linked on the 3-position of the carbazole ring.

It is to be understood that groups listed for A are orientated such that the left side is attached to the carbazole ring and the right side is linked to B. For example for the group of the formula -NHC(O)-, nitrogen is attached to the carbazole ring and the -C(O)-is linked to B.

Preferably B is: C_{2-10}alkylene, C_{2-10}alkenylene, or a direct bond.

Most preferably B is methylene, ethylene, -$CH(CH_3)CH_2$- or a direct bond.

In another aspect of the invention, preferably B is: C_{1-6}alkylene, C_{1-6}alkenylene, or a bond.

In another aspect of the invention, most preferably B is methylene, ethylene, $-CH(CH_3)CH_2-$, $-CH(CH_3)CH_2-$, or $-C(CH_3)=CH-$.

In another aspect of the invention, preferably B is selected from C_{1-10}alkylene, C_{2-10}alkenylene or a direct bond wherein the alkylene, alkenylene chains are optionally substituted by hydroxy, C_{1-4}alkoxy or amino.

Preferably R_3 is: hydrogen, C_{1-6}alkyl, C_{1-6}alkoxy, C_{1-6}alkoxycarbonyl, aryl, aryloxy, aryloxycarbonyl, heteroaryl, heteroaryloxy, heteroaryloxycarbonyl, heterocyclyl, heterocyclyloxy, or heterocyclyloxycarbonyl, optionally substituted as above.

Most preferably R_3 is: hydrogen, C_{1-4}alkyl, morpholino, pyridin-4-yl, pyrrolidinon-1-yl, *N*-methylpiperidin-4-yl, triazol-1-yl or imidazol-1-yl.

In another aspect of the invention, preferably R_3 is: hydrogen, C_{1-6}alkyl, C_{1-6}alkoxy, C_{1-6}alkoxycarbonyl, aryl, aryloxy, aryloxycarbonyl, heteroaryl, heteroaryloxy, heteroaryloxycarbonyl, heterocyclyl, heterocyclyloxy, heterocyclyloxycarbonyl.

In another aspect of the invention, most preferably R_3 is: hydrogen, 4-pyridinyl or -[1,2,4]-oxadiazolyl 1-substituted with 2-methoxyphenyl.

As stated above the R_3 group may be optionally substituted examples include: C_{1-4}alkyl, halo, pyridinyl, aminosulphonylphenyl, and 2-methoxyphenyl.

Preferably the group -A-B-R_3 is selected from *N'*-propylureido, *N',N'*-diethylureido, *N',N'*-dimethylureido, *N'*-pyrid-4-ylmethylureido, *N'*-pyrid-4-ylmethyl-*N'*-ethylureido, 4-methoxyanilinocarbonylamino, *N'*-benzylureido, *N'*-methyl-*N'*-benzylureido, *N'*-ethylanilinocarbonylamino, *N'*-(3-hydroxypropyl)-*N'*-pyrid-4-ylmethylureido, *N'*-methyl-*N'*-phenethylureido, *N'*-methyl-*N'*-pyrid-4-ylethylureido, *N'*-(2-*N',N'*-dimethylaminoethyl)-*N'*-methylureido, *N'*-(3-*N',N'*-dimethylaminopropyl)-*N'*-methylureido, anilinocarbonylamino, 4-fluoroanilinocarbonylamino, *N'*-phenoxyethylureido, *N'*-methylanilinocarbonylamino, *N'*-methyl-*N'*-pyrid-2-ylethylureido, *N'*-morpholinoethylureido, *N'*-ethyl-*N'*-phenoxyethylureido, *N'*-methyl-*N'*-morpholinopropylureido, *N'*-methyl-*N'*-morpholinoethylureido, *N'*-acetamidoethylureido, *N'*-methylthioethylureido, *N'*-imidazol-1-ylpropylureido, *N'*-4-hydroxycyclohexylureido, *N'*-3,5,5-trimethylcyclohexylureido, *N'*-1-ethylpyrrolidin-2-ylmethylureido, *N'*-fur-2-ylmethylureido, *N'*-tetrahydrofur-2-ylmethylureido, *N'*-morpholinopropylureido,

N'-pyrid-2-ylmethylureido, *N'*-pyrid-2-ylethylureido, *N'*-methyl-*N'*-pyrid-2-ylmethylureido, *N'*-1-benzylpiperidin-4-ylureido, *N'*-1-phenyleth-1-ylureido, *N'*-2-propynylureido, *N'*-allylureido, 3-*N',N'*-diethylaminopropylureido, *N'*-(1,1-di-*i*-butylmethyl)ureido, *N'*-methyl-*N'*-(2-*N',N'*-diethylaminoethyl)ureido, *N'*-(2-phenoxy-1-methylethylaminoindan-2-yl)ureido, *N'*-[4-(1,2,3-thiaziazol-4-yl)benzyl]ureido, *N'*-methyl-*N'*-(1-methylpiperidin-4-yl)ureido, *N'*-(2-fluoro-4-trifluoromethylbenzyl)ureido, *N'*-(1-methylpyrrolidin-2-ylethyl)ureido, *N'*-(5-methylfur-2-ylmethyl)ureido, *N'*-(4-*N',N'*-dimethylaminophenethyl)-*N'*-methylureido, *N'*-methyl-*N'*-pyrid-4-ylethylureido, *N'*-(2-anilino-1,1-dimethylethyl)ureido, *N'*-(2-anilinoethyl)ureido, *N'*-benzthiazol-2-ylureido, *N'*-(2-oxohomopiperidin-3-yl)ureido, *N'*-(4-bromobenzoylmethyl)ureido, *N'*-(benzimidazol-2-ylmethyl)ureido, *N'*-oxazol-3-ylureido, *N'*-(2-fluoro-4-chlorobenzyl)ureido, *N'*-(3-*N'*-methylaminopropyl)-*N'*-methylureido, *N'*-(9-ethylcarbazol-3-yl)ureido, piperidin-1-ylcarbonylamino, morpholinocarbonylamino, 4-methylpiperazin-1-ylcarbonylamino, 3-methyl-2-phenylmorpholinocarbonylamino, 4-benzylpiperazin-1-ylcarbonylamino, 2-pyrrolidin-1-ylmethylpyrrolidin-1-ylcarbonylamino, pyrrolidin-1-ylpiperidin-1-ylcarbonylamino, 4-ethoxycarbonylpiperidin-1-ylcarbonylamino, 4-hydroxymethylpiperidin-1-ylcarbonylamino, 4-carboxypiperidin-1-ylcarbonylamino, 4-mesyloxymethylpiperidin-1-ylcarbonylamino, 4-*N,N*-dimethylaminomethylpiperidin-1-ylcarbonylamino, 4-phenoxymethylpiperidin-1-ylcarbonylamino, 4-*N*-methylcarbamoylpiperidin-1-ylcarbonylamino, 4-*N,N*-dimethylcarbamoylpiperidin-1-ylcarbonylamino, 4-*n*-butylcarbamoylpiperidin-1-ylcarbonylamino, 4-morpholinocarbonylpiperidin-1-ylcarbonylamino, 3-phenoxyethylpyrrolidin-1-ylcarbonylamino, 3-carbamoylpiperidin-1-ylcarbonylamino, 4-piperidin-1-ylpiperidin-1-ylcarbonylamino, 3-*t*-butoxycarbonyl(*N*-methyl)aminopyrrolidin-1-ylcarbonylamino, 3-*N*-methylaminopyrrolidin-1-ylcarbonylamino, 2,6-dimethylmorpholinocarbonylamino, amino, hydrogen, acetamido, benzimidazol-2-yl, 2-(trifluoroacetyl)ethenyl, 4-pyrid-4-ylmethylpthalazin-1-ylamino, succinimido, 4-pyrid-2-ylpiperazin-1-ylmethyl,

indol-3-ylethylaminomethyl, 3,4-dichlorobenzoylamino,
1-methylpiperidin(*N*-methyl)aminomethyl, pyrid-4-ylethylcarbonyl(*N*-methyl)amino,
pyrid-4-ylpropyl, *i*-propylcarbonyl(*N*-methyl)amino, ethoxycarbonylamino,
methoxycarbonylmesylamino, mesylamino, benzylsulphonylamino,
2-phenylethenylsulphonylamino, carbamoyl, *t*-butoxycarbonylamino,
benzyloxycarbonylamino, phenoxycarbonylamino, aminomethyl,
i-propylcarbonylaminomethyl, *N,N*-dimethylaminosulphonylamino,
4-nitrophenoxycarbonylamino, pyrid-2-ylamino, N^2-(cyano)methylthiocarboxamidine
N^2-(cyano)morpholinocarboxamidine, 6-methylpyridazin-3-ylamino,
N,N-di-(6-methylpyridazin-3-yl)amino, 6-methylpyrid-3-ylamino, pyrid-3-ylamino,
6-carbamoylpyridazin-3-ylamino, 6-trifluoromethylpyridazin-3-ylamino,
6-(pyrid-4-yl)pyridazin-3-ylamino, 6-cyanopyridazin-3-ylamino,
6-chloropyridazin-3-ylamino, benzimidazol-2-ylamino, methylcarbonylamino,
phenylcarbonylamino, ethoxycarbonylcarbonylamino, isopropylcarbonylamino,
4-methylphenoxymethylcarbonylamino, 2-pyrid-4-ylethylcarbonylamino,
2-pyrid-4-ylethenylcarbonylamino, 2-pyrid-4-yl-1-methylethenylcarbonylamino,
2-pyrid-4-yl-1-methylethylcarbonylamino,
2-[3-(2-methoxyphenyl)-1,2,4-oxadiazol-5-yl]ethylcarbonylamino,
1-*t*-butoxycarbonylpiperid-4-ylcarbonylamino, *t*-butoxycarbonylaminomethylcarbonylamino,
aminomethylcarbonylamino, 4-methoxyphenethylcarbonylamino,
2-(1,3-benzodioxol-5-yl)ethylcarbonylamino,
2-(3-phenyl-1,2,4-oxadiazol-5-yl)ethylcarbonylamino,
3-(2-phenyl-1,3,4-oxadiazol-5-yl)propylcarbonylamino,
2-(3-benzyl-1,2,4-oxadiazol-5-yl)ethylcarbonylamino, 2-methoxyphenethylcarbonylamino,
3-phenylpropylcarbonylamino, 3-(3-pyrid-4-yl-1,2,4-oxadiazol-5-yl)propylcarbonylamino,
2-phenylcyclopropylcarbonylamino, 2-phenyl-1-methylethylcarbonylamino,
3-methoxyphenethylcarbonylamino, 4-fluorophenethylcarbonylamino,
phenethylcarbonylamino, 3,4-dimethoxyphenethylcarbonylamino,
3,4,5-trimethoxyphenethylcarbonylamino,
3-(3-pyrid-2-yl-1,2,4-oxadiazol-5-yl)propylcarbonylamino, 4-mesylphenethylcarbonylamino,
3-trifluorophenethylcarbonylamino, piperid-1-ylcarbonylamino,

2-fur-2-ylethylcarbonylamino, methoxycarbonylmethylcarbonylamino, cyclohexylcarbonylamino, *t*-butylcarbonylamino, 1-methylbutylcarbonylamino, cyanomethylcarbonylamino, *i*-butylcarbonylamino, 2-oxopyrrolidin-5-ylcarbonylamino, cyclobutylcarbonylamino, 2-carbamoylethylcarbonylamino, 1-ethylpropylcarbonylamino, 2-oxotetrahydrofur-5-ylcarbonylamino, 2-oxotetrahydrothiazol-4-ylcarbonylamino, 1-methyl-1-phenylmethylcarbonylamino, 2,2,2-trifluoroethylcarbonylamino, ureidomethylcarbonylamino, methoxycarbonylaminomethylcarbonylamino, triazol-1-ylmethylcarbonylamino, 1-methylpyrrolidin-2-ylcarbonylamino, 1-methylpiperid-4-ylcarbonylamino, 2-oxopyrrolidin-1-ylmethylcarbonylamino, 2-methoxycarbonylethylcarbonylamino, 2,3-dihydropyran-2-ylcarbonylamino, 1-acetamidoethylcarbonylamino, *N,N*-dimethylaminomethylcarbonylamino, 2-prop-2-enylcarbonylamino, tetrahydropyran-2-ylcarbonylamino, 2-pyrid-3-ylethenylcarbonylamino, imidazol-4-ylcarbonylamino, methoxyethylcarbonylamino, *N,N*-dimethylcarbamoylethylcarbonylamino, pyrazol-4-ylcarbonylamino, fur-2-ylmethylcarbonylamino, 5-methylisoxazol-3-ylcarbonylamino, imidazol-1-ylethylcarbonylamino, 4-cyanophenylcarbonylamino, *N,N*-dimethylaminoethylcarbonylamino, 1-hydroxy-1-methyl-2,2,2-trifluoroethylcarbonylamino, 1-methyl-1-acetoxyethylcarbonylamino, 1-methyl-1-hydroxyethylcarbonylamino, 1-morpholinoprop-2-ylcarbonylamino, thien-2-ylpropylcarbonylamino, 2-(3-bromoisoxazol-5-yl)ethylcarbonylamino, imidazol-4-ylethylcarbonylamino, 2-(pyrid-4-ylcarbonyl)ethylcarbonylamino, cyclopropylcarbonylamino, mesylmethylcarbonylamino, 1-*t*-butoxycarbonylamino-2-methoxyethylcarbonylamino, 1-methyl-2-(*t*-butoxycarbonylamino)ethylcarbonylamino, tetrazol-1-ylmethylcarbonylamino, 1,2,5-thiadiazol-3-ylcarbonylamino, thiazol-4-ylcarbonylamino, 1,2,4-triazol-1-ylethylcarbonylamino, 1,2,4-triazol-3-ylcarbonylamino, fur-2-ylcarbonylamino, thien-2-ylmethylcarbonylamino, 4-methylphenylsulphonylmethylcarbonylamino, 2-methoxy-1-aminoethylcarbonylamino, 1-amino-1-methylethylcarbonylamino, 2-chloro-3-methoxy-thien-4-ylcarbonylamino, 3,5-dimethylisoxazol-4-ylcarbonylamino, 1,2,3-thiadiazol-4-ylcarbonylamino,

2-methylfur-4-ylcarbonylamino, 1,1-dioxotetrahydrothien-3-ylmethylcarbonylamino, 3-amino-1,2,4-tetrazol-5-ylcarbonylamino or isothiazol-5-ylcarbonylamino.

More preferably the group -A-B-R_3 is selected from *N'*-(2-*N',N'*-dimethylaminoethyl)-*N'*-methylureido, *N'*-(3-*N',N'*-dimethylaminopropyl)-*N'*-methylureido, *N'*-methyl-*N'*-pyrid-2-ylethylureido, *N'*-acetamidoethylureido, *N'*-1-phenyleth-1-ylureido, *N'*-(1-methylpyrrolidin-2-ylethyl)ureido, *N'*-methyl-*N'*-pyrid-4-ylethylureido, morpholinocarbonylamino, 4-*N,N*-dimethylaminomethylpiperidin-1-ylcarbonylamino, 4-morpholinocarbonylpiperidin-1-ylcarbonylamino, amino, 6-carbamoylpyridazin-3-ylamino, 6-(pyrid-4-yl)pyridazin-3-ylamino, isopropylcarbonylamino, 2-pyrid-4-ylethenylcarbonylamino, 2-oxotetrahydrothiazol-4-ylcarbonylamino, 1,2,4-triazol-1-ylmethylcarbonylamino, 2-oxopyrrolidin-1-ylmethylcarbonylamino, imidazol-1-ylethylcarbonylamino, 2-(3-bromoisoxazol-5-yl)ethylcarbonylamino or isothiazol-5-ylcarbonylamino.

Preferably R_4 is hydrogen or nitro.

Most preferably R_4 is hydrogen.

In another aspect of the invention, preferably R_4 is selected from hydrogen, C_{1-4}alkyl, or nitro.

In another aspect of the invention, more preferably R_4 is selected from hydrogen, methyl, or nitro.

In another aspect of the invention, particularly R_4 is selected from hydrogen or methyl.

In another aspect of the invention, preferred compounds of the invention are any one of the Examples or a pharmaceutically acceptable salt, prodrug or solvate thereof.

In a further aspect of the invention, preferred compounds of the invention are:

9-isopropyl-3-(6-carbamoylpyridazin-3-ylamino)carbazole;

9-ethyl-3-(6-carbamoylpyridazin-3-ylamino)carbazole;

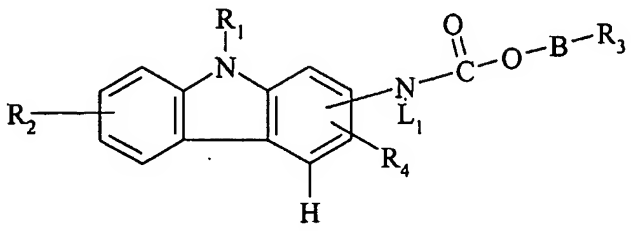
9-isopropyl-3-(morpholinocarbonylamino)carbazole;

9-ethyl-3-(morpholinocarbonylamino)carbazole;

9-ethyl-3-(1,2,4-triazil-1-ylmethylcarbonylamino)carbazole;

or a pharmaceutically acceptable salt, prodrug or solvate thereof.

According to a second feature of the invention there is provided a compound of the formula **(II)**:



(II)

wherein:

$\mathbf{R_1}$ is selected from hydrogen, C_{1-6}alkyl, C_{1-4}alkoxyC_{1-4}alkyl, C_{1-6}alkanoyl, C_{1-4}alkanoylC_{1-4}alkyl, aryl, arylC_{1-4}alkyl, arylC_{1-4}alkoxyC_{1-4}alkyl, arylC_{1-4}alkanoyl, arylcarbonyl, heteroaryl, heteroarylC_{1-4}alkyl, heteroarylC_{1-4}alkoxyC_{1-4}alkyl, heteroarylC_{1-4}alkanoyl, heteroarylcarbonyl, heterocyclyl, heterocyclylC_{1-4}alkyl, heterocyclylC_{1-4}alkoxyC_{1-4}alkyl, heterocyclylC_{1-4}alkanoyl, heterocyclylcarbonyl, carbocyclyl, carbocyclylC_{1-4}alkyl, carbocyclylC_{1-4}alkoxyC_{1-4}alkyl, carbocyclylC_{1-4}alkanoyl, carbocyclylcarbonyl, C_{1-4}alkylsulphonyl, *N,N*-di-C_{1-4}alkylaminosulphonyl or *N*-C_{1-4}alkylaminosulphonyl wherein R_1 may be optionally substituted (on an available carbon atom) by up to three substituents independently selected from: C_{1-4}alkyl optionally substituted by up to three fluoro substituents, C_{1-4}alkoxy, C_{1-4}alkanoyl, carboxy, hydroxy, halo, cyano, amino, *N*-C_{1-4}alkylamino, *N,N*-di-C_{1-4}alkylamino, C_{1-4}alkanoylamino, mercapto, C_{1-4}alkylsulphonyl, C_{1-4}alkylsulphinyl, C_{1-4}alkylsulphanyl, nitro, heteroarylC_{1-4}alkanoylamino, or C_{1-4}alkoxycarbonyl;

$\mathbf{R_2}$ is selected from hydrogen, C_{1-4}alkyl (optionally substituted by hydroxy), C_{1-4}alkoxy, cyano, nitro, halo, amino, *N*-C_{1-4}alkylamino, or *N,N*-di-C_{1-4}alkylamino;

$\mathbf{L_1}$ is selected from hydrogen or C_{1-4}alkyl;

B is selected from C_{1-10}alkylene, C_{2-10}alkenylene, C_{2-10}alkynylene, or a direct bond wherein the alkylene, alkenylene and alkynylene chains are optionally substituted by hydroxy, C_{1-4}alkoxy or amino;

$\mathbf{R_3}$ is selected from hydrogen, hydroxy, C_{1-6}alkoxy, C_{1-6}alkanoyl, C_{1-6}alkanoyloxy, C_{1-6}alkanoylamino, C_{1-6}alkoxycarbonyl, aryl, aryloxy, arylcarbonyl, arylC_{1-4}alkyl, arylC_{1-4}alkoxy, arylC_{1-4}alkanoyl, aryloxycarbonyl, arylC_{1-4}alkoxycarbonyl, arylamino, diarylamino, arylsulphonyl, heteroaryl, heteroaryloxy, heteroarylC_{1-4}alkoxy,

heteroarylcarbonyl, heteroarylC_{1-4}alkanoyl, heteroaryloxycarbonyl, heteroarylC_{1-4}alkoxycarbonyl, heteroarylC_{1-4}alkyl, heteroarylamino, heteroarylsulphonyl, diheteroarylamino, heterocyclyl, heterocyclyloxy, heterocyclylC_{1-4}alkoxy, heterocyclylcarbonyl, heterocyclylC_{1-4}alkanoyl, heterocyclyloxycarbonyl, heterocyclylC_{1-4}alkoxycarbonyl, heterocyclylC_{1-4}alkyl, heterocyclylamino, diheterocyclylamino, heterocyclylsulphonyl, carbocyclyl, carbocyclyloxy, carbocyclylC_{1-4}alkoxy, carbocyclylcarbonyl, carbocyclylC_{1-4}alkanoyl, carbocyclyloxycarbonyl, carbocyclylC_{1-4}alkoxycarbonyl, carbocyclylC_{1-4}alkyl, carbocyclylamino, carbocyclylsulphonyl, dicarbocyclylamino, cyano, carbamoyl, ureido, amino, *N*-C_{1-4}alkylamino, *N,N*-di-C_{1-4}alkylamino, C_{1-4}alkoxycarbonylamino, carbamoyl, *N*-C_{1-4}alkylcarbamoyl, *N,N*-di-C_{1-4}alkylcarbamoyl, C_{1-4}alkylsulphanyl, C_{1-4}alkylsulphinyl, C_{1-4}alkylsulphonyl, trifluoromethyl or fluoro wherein R_3 may be optionally substituted by up to three substituents independently selected from C_{1-4}alkyl, hydroxyC_{1-4}alkyl, C_{1-4}alkoxy, C_{1-6}alkoxycarbonyl, C_{2-6}alkenyloxycarbonyl, C_{1-4}alkanoyl, C_{1-4}alkanoylamino, C_{1-4}alkanoylthio, oxo, carboxy, hydroxy, halo, cyano, amino, *N*-C_{1-4}alkylamino, *N,N*-di-C_{1-4}alkylamino, *N*-C_{1-4}alkylaminoC_{1-4}alkyl, *N,N*-di-C_{1-4}alkylaminoC_{1-4}alkyl, carbamoyl, *N*-C_{1-4}alkylcarbamoyl, *N,N*-di-C_{1-4}alkylcarbamoyl, mercapto, C_{1-4}alkylsulphonyl, C_{1-4}alkylsulphinyl, C_{1-4}alkylsulphanyl, C_{1-4}alkylsulphonyloxyC_{1-4}alkyl, nitro, trifluoromethyl, trifluoromethylC_{1-4}alkyl, C_{1-6}alkoxycarbonylamino, C_{1-6}alkoxycarbonyl(N-C_{1-4}alkyl)amino, aryl (optionally substituted by one C_{1-4}alkoxy or sulphamoyl), arylC_{1-4}alkyl, aryloxyC_{1-4}alkyl, arylcarbonyl, heteroaryl, heteroarylC_{1-4}alkyl, heteroaryloxyC_{1-4}alkyl, heteroarylcarbonyl, heterocyclyl, heterocyclylC_{1-4}alkyl, heterocyclyloxyC_{1-4}alkyl, heterocyclylcarbonyl, carbocyclyl, carbocyclylC_{1-4}alkyl, carbocyclyloxyC_{1-4}alkyl or carbocyclylcarbonyl; and

R_4 is selected from hydrogen, C_{1-4}alkyl, halo or nitro;

or a pharmaceutically acceptable salt, prodrug or solvate thereof;

with the proviso that when R_1 is hydrogen, methyl, ethyl or acetyl, R_2 is hydrogen, B is a direct bond or -CH_2-, R_4 is hydrogen then R_3 cannot be phenyl; when -N(L_1)C(O)O- is linked on the 3 position of the carbazole ring, R_1 is methyl or ethyl, R_2 is hydrogen, B is -C_2H_4- and R_4 is hydrogen then R_3 cannot be hydrogen; and when R_1 is benzyl or 2-methoxy-4-carboxy-benzyl, R_2 is hydrogen, B is a direct bond, R_4 is hydrogen then R_3 cannot be ethyl or cyclopentyl.

According to an alternative second feature of the invention there is provided a compound of the formula **(II)** (as depicted above) wherein:

R_1 is selected from hydrogen, C_{1-6}alkyl, C_{1-4}alkoxyC_{1-4}alkyl, C_{1-6}alkanoyl, C_{1-4}alkanoylC_{1-4}alkyl, aryl, arylC_{1-4}alkyl, arylC_{1-4}alkoxyC_{1-4}alkyl, arylC_{1-4}alkanoyl, arylcarbonyl, heteroaryl, heteroarylC_{1-4}alkyl, heteroarylC_{1-4}alkoxyC_{1-4}alkyl, heteroarylC_{1-4}alkanoyl, heteroarylcarbonyl, heterocyclyl, heterocyclylC_{1-4}alkyl, heterocyclylC_{1-4}alkoxyC_{1-4}alkyl, heterocyclylC_{1-4}alkanoyl, heterocyclylcarbonyl, carbocyclyl, carbocyclylC_{1-4}alkyl, carbocyclylC_{1-4}alkoxyC_{1-4}alkyl, carbocyclylC_{1-4}alkanoyl, carbocyclylcarbonyl, C_{1-4}alkylsulphonyl, *N,N*-di-C_{1-4}alkylaminosulphonyl or *N*-C_{1-4}alkylaminosulphonyl wherein R_1 may be optionally substituted (on an available carbon atom) by up to three substituents independently selected from: C_{1-4}alkyl optionally substituted by upto three fluoro substituents, C_{1-4}alkoxy, C_{1-4}alkanoyl, carboxy, hydroxy, halo, cyano, amino, *N*-C_{1-4}alkylamino, *N,N*-di-C_{1-4}alkylamino, C_{1-4}alkanoylamino, mercapto, C_{1-4}alkylsulphonyl, C_{1-4}alkylsulphinyl, C_{1-4}alkylsulphanyl, nitro, heteroarylC_{1-4}alkanoylamino, or C_{1-4}alkoxycarbonyl;

L_1 is hydrogen or C_{1-4}alkyl;

B is C_{1-10}alkylene, C_{2-10}alkenylene, C_{2-10}alkynylene, or a direct bond wherein the alkylene, alkenylene and alkynylene chains are optionally substituted by hydroxy, C_{1-4}alkoxy or amino;

R_3 is hydrogen, hydroxy, C_{1-6}alkoxy, C_{1-6}alkanoyl, C_{1-6}alkanoyloxy, C_{1-6}alkanoylamino, C_{1-6}alkoxycarbonyl, C_{1-4}alkoxycarbonylamino, aryl, aryloxy, arylcarbonyl, arylC_{1-4}alkyl, arylC_{1-4}alkoxy, arylC_{1-4}alkanoyl, aryloxycarbonyl, arylC_{1-4}alkoxycarbonyl, arylamino, heteroaryl, heteroaryloxy, heteroarylC_{1-4}alkoxy, heteroarylcarbonyl, heteroarylC_{1-4}alkanoyl, heteroaryloxycarbonyl, heteroarylC_{1-4}alkoxycarbonyl, heterocyclyl, heterocyclyloxy, heterocyclylC_{1-4}alkoxy, heterocyclylcarbonyl, heterocyclylC_{1-4}alkanoyl, heterocyclyloxycarbonyl, heterocyclylC_{1-4}alkoxycarbonyl, carbocyclyl, carbocyclyloxy, carbocyclylC_{1-4}alkoxy, carbocyclylcarbonyl, carbocyclylC_{1-4}alkanoyl, carbocyclyloxycarbonyl, carbocyclylC_{1-4}alkoxycarbonyl, cyano, carbamoyl, ureido, amino, *N*-C_{1-4}alkylamino, *N,N*-di-C_{1-4}alkylamino, C_{1-4}alkoxycarbonylamino, aminocarbonyl, *N*-C_{1-4}alkylaminocarbonyl, *N,N*-di-C_{1-4}alkylaminocarbonyl, C_{1-4}alkylthio, trifluoromethyl or fluoro wherein R_3 may be optionally substituted by up to three substituents independently

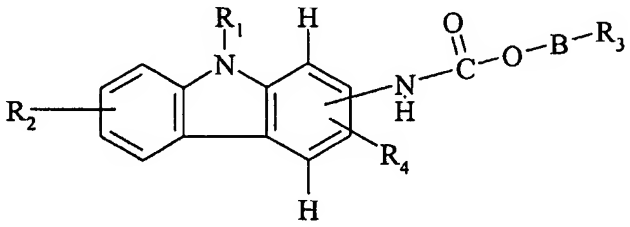
selected from C_{1-4}alkyl, hydroxyC_{1-4}alkyl, C_{1-4}alkoxy, C_{1-6}alkoxycarbonyl, C_{1-6}alkenyloxycarbonyl, C_{1-4}alkanoyl, C_{1-4}alkanoylamino, C_{1-4}alkanoylthio, oxo, carboxy, hydroxy, halo, cyano, amino, *N*-C_{1-4}alkylamino, *N,N*-di-C_{1-4}alkylamino, *N*-C_{1-4}alkylaminoC_{1-4}alkyl, *N,N*-di-C_{1-4}alkylaminoC_{1-4}alkyl, aminocarbonyl, *N*-C_{1-4}alkylaminocarbonyl, *N,N*-di-C_{1-4}alkylaminocarbonyl, mercapto, C_{1-4}alkylsulphonyl, C_{1-4}alkylsulphinyl, C_{1-4}alkylsulphanyl, nitro, trifluoromethyl, trifluoromethylC_{1-4}alkyl, aryl, arylC_{1-4}alkyl, aryloxyC_{1-4}alkyl, C_{1-4}alkoxyphenyl, heteroaryl, heteroarylC_{1-4}alkyl, heterocyclylcarbonyl, or aminosulphonylphenyl; and

R_4 is hydrogen, C_{1-4}alkyl, halo or nitro;

or a pharmaceutically acceptable salt, prodrug or solvate thereof.

with the proviso that when R_1 is hydrogen, methyl, ethyl or acetyl, R_2 is hydrogen, B is a direct bond or -CH_2-, R_4 is hydrogen then R_3 cannot be phenyl; when -N(L_1)C(O)O- is linked on the 3 position of the carbazole ring, R_1 is methyl or ethyl, R_2 is hydrogen, B is -C_2H_4- and R_4 is hydrogen then R_3 cannot be hydrogen; and when R_1 is benzyl or 2-methoxy-4-carboxy-benzyl, R_2 is hydrogen, B is a direct bond, R_4 is hydrogen then R_3 cannot be ethyl or cyclopentyl.

According to a further second feature of the invention there is provided a compound of the formula **(II')**:



(II')

wherein:

R_1 is selected from hydrogen, C_{1-6}alkyl, C_{1-4}alkoxyC_{1-4}alkyl, C_{1-6}alkanoyl, C_{1-4}alkanoylC_{1-4}alkyl, aryl, arylC_{1-4}alkyl, arylC_{1-4}alkoxyC_{1-4}alkyl, arylC_{1-4}alkanoyl, arylcarbonyl, heteroaryl, heteroarylC_{1-4}alkyl, heteroarylC_{1-4}alkoxyC_{1-4}alkyl, heteroarylC_{1-4}alkanoyl, heteroarylcarbonyl, heterocyclyl, heterocyclylC_{1-4}alkyl, heterocyclylC_{1-4}alkoxyC_{1-4}alkyl, heterocyclylC_{1-4}alkanoyl, heterocyclylcarbonyl, carbocyclyl, carbocyclylC_{1-4}alkyl, carbocyclylC_{1-4}alkoxyC_{1-4}alkyl, carbocyclylC_{1-4}alkanoyl, carbocyclylcarbonyl, cyanoC_{1-4}alkyl, aminoC_{1-4}alkyl, *N*-C_{1-4}alkylaminoC_{1-4}alkyl, or

N,N-di-C_{1-4}alkylaminoC_{1-4}alkyl; wherein R_1 may be optionally substituted (on an available carbon atom) by up to three substituents independently selected from: C_{1-4}alkyl, C_{1-4}alkoxy, C_{1-4}alkanoyl, carboxy, hydroxy, halo, cyano, amino, *N*-C_{1-4}alkylamino, *N,N*-di-C_{1-4}alkylamino, C_{1-4}alkanoylamino, mercapto, C_{1-4}alkylsulphonyl, C_{1-4}alkylsulphinyl, C_{1-4}alkylsulphanyl, nitro, trifluoromethyl-C_{1-4}alkyl, heteroarylC_{1-4}alkanoylamino, or C_{1-4}alkoxycarbonyl;

$\mathbf{R_2}$ is selected from hydrogen, C_{1-4}alkyl, C_{1-4}alkoxy, cyano, nitro, halo, amino, *N*-C_{1-4}alkylamino, or *N,N*-di-C_{1-4}alkylamino;

B is C_{1-6}alkylene, C_{2-6}alkenylene, C_{2-6}alkynylene, or a direct bond;

$\mathbf{R_3}$ is hydrogen, C_{1-6}alkoxy, C_{1-6}alkanoyl, C_{1-6}alkoxycarbonyl, aryl, aryloxy, aryl-C_{1-4}alkoxy, arylcarbonyl, aryl$_{1-4}$alkanoyl, aryloxycarbonyl, arylC_{1-4}alkoxycarbonyl, heteroaryl, heteroaryloxy, heteroarylC_{1-4}alkoxy, heteroarylcarbonyl, heteroaryl-C_{1-4}alkanoyl, heteroaryloxycarbonyl, heteroarylC_{1-4}alkoxycarbonyl, heterocyclyl, heterocyclyloxy, heterocyclylC_{1-4}alkoxy, heterocyclylcarbonyl, heterocyclylC_{1-4}alkanoyl, heterocyclyloxycarbonyl, heterocyclylC_{1-4}alkoxycarbonyl, carbocyclyl, carbocyclyloxy, carbocyclylC_{1-4}alkoxy, carbocyclylcarbonyl, carbocyclylC_{1-4}alkanoyl, carbocyclyloxycarbonyl, carbocyclylC_{1-4}alkoxycarbonyl, amino, *N*-C_{1-4}alkylamino, *N,N*-di-C_{1-4}alkylamino, C_{1-4}alkylthio wherein R_3 may be optionally substituted (on an available carbon atom) by up to three substituents independently selected from C_{1-4}alkyl, C_{1-4}alkoxy, C_{1-4}alkanoyl, carboxy, hydroxy, halo, cyano, amino, *N*-C_{1-4}alkylamino, *N,N*-di-C_{1-4}alkylamino, C_{1-4}alkanoylamino, mercapto, C_{1-4}alkylsulphonyl, C_{1-4}alkylsulphinyl, C_{1-4}alkylsulphanyl, nitro, trifluoromethylC_{1-4}alkyl, phenyl, C_{1-4}alkoxyphenyl, heteroaryl, heteroarylC_{1-4}alkyl, aminosulphonylphenyl or C_{1-4}alkoxycarbonyl; and

$\mathbf{R_4}$ is hydrogen, C_{1-4}alkyl, or nitro;

or a pharmaceutically acceptable salt, prodrug or solvate thereof;

with the proviso that compound of formula **(I)** is not selected from:

Carbamic acid, (9-ethyl-9H-carbazol-3-yl)-, phenylmethyl ester;

Carbamic acid, 9H-carbazol-3-yl-, phenylmethyl ester;

Carbamic acid, (9-acetyl-9H-carbazol-3-yl)-, phenylmethyl ester;

Carbamic acid, (9-methyl-9H-carbazol-3-yl)-, ethyl ester;

Carbamic acid, (9-methyl-9H-carbazol-2-yl)-, phenylmethyl ester;

Carbamic acid, (9-ethyl-9H-carbazol-3-yl)-, phenyl ester;

Benzoic acid, 4-[[2-[[(cyclopentyloxy)carbonyl]amino]-9H-carbazol-9-yl]methyl] -3-methoxy-;

Carbamic acid, [9-(phenylmethyl)-9H-carbazol-3-yl]-, ethyl ester, or

Carbamic acid, (9-ethyl-9H-carbazol-3-yl)-, ethyl ester.

According to an alternative further second feature of the invention there is provided a compound of the formula **(II')** (as depicted above) wherein:

$\mathbf{R_1}$ is selected from hydrogen, C_{1-6}alkyl, C_{1-4}alkoxyC_{1-4}alkyl, C_{1-6}alkanoyl, C_{1-4}alkanoylC_{1-4}alkyl, aryl, arylC_{1-4}alkyl, arylC_{1-4}alkoxyC_{1-4}alkyl, arylC_{1-4}alkanoyl, arylcarbonyl, heteroaryl, heteroarylC_{1-4}alkyl, heteroarylC_{1-4}alkoxyC_{1-4}alkyl, heteroarylC_{1-4}alkanoyl, heteroarylcarbonyl, heterocyclyl, heterocyclylC_{1-4}alkyl, heterocyclylC_{1-4}alkoxyC_{1-4}alkyl, heterocyclylC_{1-4}alkanoyl, heterocyclylcarbonyl, carbocyclyl, carbocyclylC_{1-4}alkyl, carbocyclylC_{1-4}alkoxyC_{1-4}alkyl, carbocyclylC_{1-4}alkanoyl, carbocyclylcarbonyl, cyanoC_{1-4}alkyl, aminoC_{1-4}alkyl, *N*-C_{1-4}alkylaminoC_{1-4}alkyl, or *N,N*-di-C_{1-4}alkylaminoC_{1-4}alkyl; wherein R_1 may be optionally substituted (on an available carbon atom) by up to three substituents independently selected from: C_{1-4}alkyl, C_{1-4}alkoxy, C_{1-4}alkanoyl, carboxy, hydroxy, halo, cyano, amino, *N*-C_{1-4}alkylamino, *N,N*-di-C_{1-4}alkylamino, C_{1-4}alkanoylamino, mercapto, C_{1-4}alkylsulphonyl, C_{1-4}alkylsulphinyl, C_{1-4}alkylsulphanyl, nitro, trifluoromethyl-C_{1-4}alkyl, heteroarylC_{1-4}alkanoylamino, or C_{1-4}alkoxycarbonyl;

$\mathbf{R_2}$ is selected from hydrogen, C_{1-4}alkyl, C_{1-4}alkoxy, cyano, nitro, halo, amino, *N*-C_{1-4}alkylamino, or *N,N*-di-C_{1-4}alkylamino;

$\mathbf{L_1}$ is hydrogen or C_{1-4}alkyl;

B is C_{1-6}alkylene, C_{2-6}alkenylene, C_{2-6}alkynylene, or a direct bond;

$\mathbf{R_3}$ is hydrogen, C_{1-6}alkoxy, C_{1-6}alkanoyl, C_{1-6}alkoxycarbonyl, aryl, aryloxy, aryl-C_{1-4}alkoxy, arylcarbonyl, aryl$_{1-4}$alkanoyl, aryloxycarbonyl, arylC_{1-4}alkoxycarbonyl, heteroaryl, heteroaryloxy, heteroarylC_{1-4}alkoxy, heteroarylcarbonyl, heteroaryl-C_{1-4}alkanoyl, heteroaryloxycarbonyl, heteroarylC_{1-4}alkoxycarbonyl, heterocyclyl, heterocyclyloxy, heterocyclylC_{1-4}alkoxy, heterocyclylcarbonyl, heterocyclylC_{1-4}alkanoyl, heterocyclyloxycarbonyl, heterocyclylC_{1-4}alkoxycarbonyl, carbocyclyl, carbocyclyloxy, carbocyclylC_{1-4}alkoxy, carbocyclylcarbonyl, carbocyclylC_{1-4}alkanoyl, carbocyclyloxycarbonyl, carbocyclylC_{1-4}alkoxycarbonyl, amino, *N*-(C_{1-4}alkyl)amino, *N,N*-di-(C_{1-4}alkyl)amino, C_{1-4}alkylthio or fluoro wherein R_3 may be optionally substituted (on

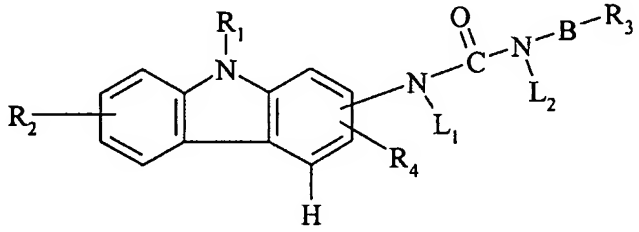
an available carbon atom) by up to three substituents independently selected from C_{1-4}alkyl, C_{1-4}alkoxy, C_{1-4}alkanoyl, carboxy, hydroxy, halo, cyano, amino, *N*-C_{1-4}alkylamino, *N,N*-di-C_{1-4}alkylamino, C_{1-4}alkanoylamino, mercapto, C_{1-4}alkylsulphonyl, C_{1-4}alkylsulphinyl, C_{1-4}alkylsulphanyl, nitro, trifluoromethylC_{1-4}alkyl, phenyl, C_{1-4}alkoxyphenyl, heteroaryl, heteroarylC_{1-4}alkyl, aminosulphonylphenyl or C_{1-4}alkoxycarbonyl; and

R_4 is hydrogen, C_{1-4}alkyl, or nitro;

or a pharmaceutically acceptable salt, prodrug or solvate thereof;

with the proviso that when R_1 is hydrogen, methyl, ethyl or acetyl, R_2 is hydrogen, B is a direct bond or $-CH_2-$, R_4 is hydrogen then R_3 cannot be phenyl; when $-N(L_1)C(O)O-$ is linked on the 3 position of the carbazole ring, R_1 is methyl or ethyl, R_2 is hydrogen, B is $-C_2H_4-$ and R_4 is hydrogen then R_3 cannot be hydrogen; and when R_1 is benzyl or 2-methoxy-4-carboxy-benzyl, R_2 is hydrogen, B is a direct bond, R_4 is hydrogen then R_3 cannot be ethyl or cyclopentyl.

According to a third feature of the invention there is provided a compound of the formula **(III)**:



(III)

wherein:

R_1 is selected from hydrogen, C_{1-6}alkyl, C_{1-4}alkoxyC_{1-4}alkyl, C_{1-6}alkanoyl, C_{1-4}alkanoylC_{1-4}alkyl, aryl, arylC_{1-4}alkyl, arylC_{1-4}alkoxyC_{1-4}alkyl, arylC_{1-4}alkanoyl, arylcarbonyl, heteroaryl, heteroarylC_{1-4}alkyl, heteroarylC_{1-4}alkoxyC_{1-4}alkyl, heteroarylC_{1-4}alkanoyl, heteroarylcarbonyl, heterocyclyl, heterocyclylC_{1-4}alkyl, heterocyclylC_{1-4}alkoxyC_{1-4}alkyl, heterocyclylC_{1-4}alkanoyl, heterocyclylcarbonyl, carbocyclyl, carbocyclylC_{1-4}alkyl, carbocyclylC_{1-4}alkoxyC_{1-4}alkyl, carbocyclylC_{1-4}alkanoyl, carbocyclylcarbonyl, C_{1-4}alkylsulphonyl, *N,N*-di-C_{1-4}alkylaminosulphonyl or *N*-C_{1-4}alkylaminosulphonyl wherein R_1 may be optionally substituted (on an available carbon atom) by up to three substituents independently selected from: C_{1-4}alkyl optionally substituted

by up to three fluoro substituents, C_{1-4}alkoxy, C_{1-4}alkanoyl, carboxy, hydroxy, halo, cyano, amino, *N*-C_{1-4}alkylamino, *N,N*-di-C_{1-4}alkylamino, C_{1-4}alkanoylamino, mercapto, C_{1-4}alkylsulphonyl, C_{1-4}alkylsulphinyl, C_{1-4}alkylsulphanyl, nitro, heteroarylC_{1-4}alkanoylamino, or C_{1-4}alkoxycarbonyl;

$\mathbf{R_2}$ is selected from hydrogen, C_{1-4}alkyl (optionally substituted by hydroxy), C_{1-4}alkoxy, cyano, nitro, halo, amino, *N*-C_{1-4}alkylamino, or *N,N*-di-C_{1-4}alkylamino;

$\mathbf{L_1}$ is selected from hydrogen or C_{1-4}alkyl;

$\mathbf{L_2}$ is selected from hydrogen or C_{1-4}alkyl;

B is selected from C_{1-10}alkylene, C_{2-10}alkenylene, C_{2-10}alkynylene, or a direct bond wherein the alkylene, alkenylene and alkynylene chains are optionally substituted by hydroxy, C_{1-4}alkoxy or amino;

$\mathbf{R_3}$ is selected from hydrogen, hydroxy, C_{1-6}alkoxy, C_{1-6}alkanoyl, C_{1-6}alkanoyloxy, C_{1-6}alkanoylamino, C_{1-6}alkoxycarbonyl, aryl, aryloxy, arylcarbonyl, arylC_{1-4}alkyl, arylC_{1-4}alkoxy, arylC_{1-4}alkanoyl, aryloxycarbonyl, arylC_{1-4}alkoxycarbonyl, arylamino, diarylamino, arylsulphonyl, heteroaryl, heteroaryloxy, heteroarylC_{1-4}alkoxy, heteroarylcarbonyl, heteroarylC_{1-4}alkanoyl, heteroaryloxycarbonyl, heteroarylC_{1-4}alkoxycarbonyl, heteroarylC_{1-4}alkyl, heteroarylamino, heteroarylsulphonyl, diheteroarylamino, heterocyclyl, heterocyclyloxy, heterocyclylC_{1-4}alkoxy, heterocyclylcarbonyl, heterocyclylC_{1-4}alkanoyl, heterocyclyloxycarbonyl, heterocyclylC_{1-4}alkoxycarbonyl, heterocyclylC_{1-4}alkyl, heterocyclylamino, diheterocyclylamino, heterocyclylsulphonyl, carbocyclyl, carbocyclyloxy, carbocyclylC_{1-4}alkoxy, carbocyclylcarbonyl, carbocyclylC_{1-4}alkanoyl, carbocyclyloxycarbonyl, carbocyclylC_{1-4}alkoxycarbonyl, carbocyclylC_{1-4}alkyl, carbocyclylamino, carbocyclylsulphonyl, dicarbocyclylamino, cyano, carbamoyl, ureido, amino, *N*-C_{1-4}alkylamino, *N,N*-di-C_{1-4}alkylamino, C_{1-4}alkoxycarbonylamino, carbamoyl, *N*-C_{1-4}alkylcarbamoyl, *N,N*-di-C_{1-4}alkylcarbamoyl, C_{1-4}alkylsulphanyl, C_{1-4}alkylsulphinyl, C_{1-4}alkylsulphonyl, trifluoromethyl or fluoro wherein R_3 may be optionally substituted by up to three substituents independently selected from C_{1-4}alkyl, hydroxyC_{1-4}alkyl, C_{1-4}alkoxy, C_{1-6}alkoxycarbonyl, C_{2-6}alkenyloxycarbonyl, C_{1-4}alkanoyl, C_{1-4}alkanoylamino, C_{1-4}alkanoylthio, oxo, carboxy, hydroxy, halo, cyano, amino, *N*-C_{1-4}alkylamino, *N,N*-di-C_{1-4}alkylamino, *N*-C_{1-4}alkylaminoC_{1-4}alkyl, *N,N*-di-C_{1-4}alkylaminoC_{1-4}alkyl, carbamoyl,

N-C_{1-4}alkylcarbamoyl, *N,N*-di-C_{1-4}alkylcarbamoyl, mercapto, C_{1-4}alkylsulphonyl, C_{1-4}alkylsulphinyl, C_{1-4}alkylsulphanyl, C_{1-4}alkylsulphonyloxyC_{1-4}alkyl, nitro, trifluoromethyl, trifluoromethylC_{1-4}alkyl, C_{1-6}alkoxycarbonylamino, C_{1-6}alkoxycarbonyl(N-C_{1-4}alkyl)amino, aryl (optionally substituted by one C_{1-4}alkoxy or sulphamoyl), arylC_{1-4}alkyl, aryloxyC_{1-4}alkyl, arylcarbonyl, heteroaryl, heteroarylC_{1-4}alkyl, heteroaryloxyC_{1-4}alkyl, heteroarylcarbonyl, heterocyclyl, heterocyclylC_{1-4}alkyl, heterocyclyloxyC_{1-4}alkyl, heterocyclylcarbonyl, carbocyclyl, carbocyclylC_{1-4}alkyl, carbocyclyloxyC_{1-4}alkyl or carbocyclylcarbonyl; and

R_4 is selected from hydrogen, C_{1-4}alkyl, halo or nitro;

or a pharmaceutically acceptable salt, prodrug or solvate thereof;

with the proviso that when -N(L_1)- is linked on the 2-position of the carbazole ring, R_1 is hydrogen, R_2 is hydrogen, B is a direct bond, L_1 is hydrogen, L_2 is hydrogen and R_4 is hydrogen then R_3 cannot be hydrogen; and when -N(L_1)- is linked on the 3-position of the carbazole ring, R_1 is ethyl, R_2 is hydrogen, B is a direct bond or -$(CH_2)_3$-, L_1 is hydrogen, L_2 is hydrogen and R_4 is hydrogen then R_3 cannot be hydrogen, amino, *N,N*-diethylamino or naphth-1-yl.

According to an alternative third feature of the invention there is provided a compound of the formula **(III)** (as depicted above) wherein:

R_1 is selected from hydrogen, C_{1-6}alkyl, C_{1-4}alkoxyC_{1-4}alkyl, C_{1-6}alkanoyl, C_{1-4}alkanoylC_{1-4}alkyl, aryl, arylC_{1-4}alkyl, arylC_{1-4}alkoxyC_{1-4}alkyl, arylC_{1-4}alkanoyl, arylcarbonyl, heteroaryl, heteroarylC_{1-4}alkyl, heteroarylC_{1-4}alkoxyC_{1-4}alkyl, heteroarylC_{1-4}alkanoyl, heteroarylcarbonyl, heterocyclyl, heterocyclylC_{1-4}alkyl, heterocyclylC_{1-4}alkoxyC_{1-4}alkyl, heterocyclylC_{1-4}alkanoyl, heterocyclylcarbonyl, carbocyclyl, carbocyclylC_{1-4}alkyl, carbocyclylC_{1-4}alkoxyC_{1-4}alkyl, carbocyclylC_{1-4}alkanoyl, carbocyclylcarbonyl, C_{1-4}alkylsulphonyl, *N,N*-di-C_{1-4}alkylaminosulphonyl or *N*-C_{1-4}alkylaminosulphonyl wherein R_1 may be optionally substituted (on an available carbon atom) by up to three substituents independently selected from: C_{1-4}alkyl optionally substituted by up to three fluoro substituents, C_{1-4}alkoxy, C_{1-4}alkanoyl, carboxy, hydroxy, halo, cyano, amino, *N*-C_{1-4}alkylamino, *N,N*-di-C_{1-4}alkylamino, C_{1-4}alkanoylamino, mercapto, C_{1-4}alkylsulphonyl, C_{1-4}alkylsulphinyl, C_{1-4}alkylsulphanyl, nitro, heteroarylC_{1-4}alkanoylamino, or C_{1-4}alkoxycarbonyl;

L_1 is hydrogen or C_{1-4}alkyl;

L_2 is hydrogen or C_{1-4}alkyl;

B is C_{1-10}alkylene, C_{2-10}alkenylene, C_{2-10}alkynylene, or a direct bond wherein the alkylene, alkenylene and alkynylene chains are optionally substituted by hydroxy, C_{1-4}alkoxy or amino;

R_3 is hydrogen, hydroxy, C_{1-6}alkoxy, C_{1-6}alkanoyl, C_{1-6}alkanoyloxy, C_{1-6}alkanoylamino, C_{1-6}alkoxycarbonyl, C_{1-4}alkoxycarbonylamino, aryl, aryloxy, arylcarbonyl, arylC_{1-4}alkyl, arylC_{1-4}alkoxy, arylC_{1-4}alkanoyl, aryloxycarbonyl, arylC_{1-4}alkoxycarbonyl, arylamino, heteroaryl, heteroaryloxy, heteroarylC_{1-4}alkoxy, heteroarylcarbonyl, heteroarylC_{1-4}alkanoyl, heteroaryloxycarbonyl, heteroarylC_{1-4}alkoxycarbonyl, heterocyclyl, heterocyclyloxy, heterocyclylC_{1-4}alkoxy, heterocyclylcarbonyl, heterocyclylC_{1-4}alkanoyl, heterocyclyloxycarbonyl, heterocyclylC_{1-4}alkoxycarbonyl, carbocyclyl, carbocyclyloxy, carbocyclylC_{1-4}alkoxy, carbocyclylcarbonyl, carbocyclylC_{1-4}alkanoyl, carbocyclyloxycarbonyl, carbocyclylC_{1-4}alkoxycarbonyl, cyano, carbamoyl, ureido, amino, *N*-C_{1-4}alkylamino, *N,N*-di-C_{1-4}alkylamino, C_{1-4}alkoxycarbonylamino, aminocarbonyl, *N*-C_{1-4}alkylaminocarbonyl, *N,N*-di-C_{1-4}alkylaminocarbonyl, C_{1-4}alkylthio, trifluoromethyl or fluoro wherein R_3 may be optionally substituted by up to three substituents independently selected from C_{1-4}alkyl, hydroxyC_{1-4}alkyl, C_{1-4}alkoxy, C_{1-6}alkoxycarbonyl, C_{1-6}alkenyloxycarbonyl, C_{1-4}alkanoyl, C_{1-4}alkanoylamino, C_{1-4}alkanoylthio, oxo, carboxy, hydroxy, halo, cyano, amino, *N*-C_{1-4}alkylamino, *N,N*-di-C_{1-4}alkylamino, *N*-C_{1-4}alkylaminoC_{1-4}alkyl, *N,N*-di-C_{1-4}alkylaminoC_{1-4}alkyl, aminocarbonyl, *N*-C_{1-4}alkylaminocarbonyl, *N,N*-di-C_{1-4}alkylaminocarbonyl, mercapto, C_{1-4}alkylsulphonyl, C_{1-4}alkylsulphinyl, C_{1-4}alkylsulphanyl, nitro, trifluoromethyl, trifluoromethylC_{1-4}alkyl, aryl, arylC_{1-4}alkyl, aryloxyC_{1-4}alkyl, C_{1-4}alkoxyphenyl, heteroaryl, heteroarylC_{1-4}alkyl, heterocyclylcarbonyl, or aminosulphonylphenyl; and

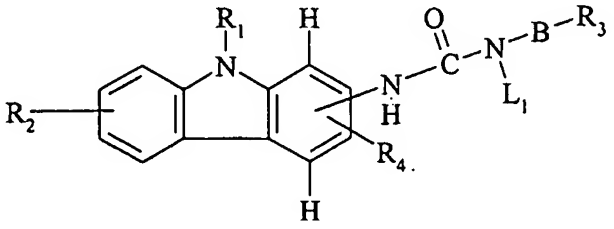
R_4 is hydrogen, C_{1-4}alkyl, halo or nitro;

or a pharmaceutically acceptable salt, prodrug or solvate thereof;

with the proviso that when -N(L_1)- is linked on the 2-position of the carbazole ring, R_1 is hydrogen, R_2 is hydrogen, B is a direct bond, L_1 is hydrogen, L_2 is hydrogen and R_4 is hydrogen then R_3 cannot be hydrogen; and when -N(L_1)- is linked on the 3-position of the carbazole ring, R_1 is ethyl, R_2 is hydrogen, B is a direct bond or -$(CH_2)_3$-, L_1 is hydrogen, L_2 is

hydrogen and R_4 is hydrogen then R_3 cannot be hydrogen, amino, *N,N*-diethylamino or naphth-1-yl.

According to a further third feature of the invention there is provided a compound of the formula **(III')**:



(III')

wherein:

R_1 is selected from hydrogen, C_{1-6}alkyl, C_{1-4}alkoxyC_{1-4}alkyl, C_{1-6}alkanoyl, C_{1-4}alkanoylC_{1-4}alkyl, aryl, arylC_{1-4}alkyl, arylC_{1-4}alkoxyC_{1-4}alkyl, arylC_{1-4}alkanoyl, arylcarbonyl, heteroaryl, heteroarylC_{1-4}alkyl, heteroarylC_{1-4}alkoxyC_{1-4}alkyl, heteroarylC_{1-4}alkanoyl, heteroarylcarbonyl, heterocyclyl, heterocyclylC_{1-4}alkyl, heterocyclylC_{1-4}alkoxyC_{1-4}alkyl, heterocyclylC_{1-4}alkanoyl, heterocyclylcarbonyl, carbocyclyl, carbocyclylC_{1-4}alkyl, carbocyclylC_{1-4}alkoxyC_{1-4}alkyl, carbocyclylC_{1-4}alkanoyl, carbocyclylcarbonyl, cyanoC_{1-4}alkyl, aminoC_{1-4}alkyl, *N*-C_{1-4}alkylaminoC_{1-4}alkyl, or *N,N*-di-C_{1-4}alkylaminoC_{1-4}alkyl; wherein R_1 may be optionally substituted (on an available carbon atom) by up to three substituents independently selected from: C_{1-4}alkyl, C_{1-4}alkoxy, C_{1-4}alkanoyl, carboxy, hydroxy, halo, cyano, amino, *N*-C_{1-4}alkylamino, *N,N*-di-C_{1-4}alkylamino, C_{1-4}alkanoylamino, mercapto, C_{1-4}alkylsulphonyl, C_{1-4}alkylsulphinyl, C_{1-4}alkylsulphanyl, nitro, trifluoromethyl-C_{1-4}alkyl, heteroarylC_{1-4}alkanoylamino, or C_{1-4}alkoxycarbonyl;

R_2 is selected from hydrogen, C_{1-4}alkyl, C_{1-4}alkoxy, cyano, nitro, halo, amino, *N*-C_{1-4}alkylamino, or *N,N*-di-C_{1-4}alkylamino;

L_1 is selected from hydrogen or C_{1-4}alkyl;

B is C_{1-6}alkylene, C_{2-6}alkenylene, C_{2-6}alkynylene, or a direct bond;

R_3 is hydrogen, C_{1-6}alkoxy, C_{1-6}alkanoyl, C_{1-6}alkoxycarbonyl, aryl, aryloxy, arylC_{1-4}alkoxy, arylcarbonyl, aryl$_{1-4}$alkanoyl, aryloxycarbonyl, arylC_{1-4}alkoxycarbonyl, heteroaryl, heteroaryloxy, heteroarylC_{1-4}alkoxy, heteroarylcarbonyl, heteroarylC_{1-4}alkanoyl, heteroaryloxycarbonyl, heteroaryl-C_{1-4}alkoxycarbonyl, heterocyclyl, heterocyclyloxy, heterocyclylC_{1-4}alkoxy, heterocyclylcarbonyl, heterocyclylC_{1-4}alkanoyl,

heterocyclyloxycarbonyl, heterocyclylC_{1-4}alkoxycarbonyl, carbocyclyl, carbocyclyloxy, carbocyclylC_{1-4}alkoxy, carbocyclylcarbonyl, carbocyclylC_{1-4}alkanoyl, carbocyclyloxycarbonyl, carbocyclylC_{1-4}alkoxycarbonyl, amino, *N*-C_{1-4}alkylamino, *N,N*-di-C_{1-4}alkylamino, C_{1-4}alkylthio wherein R_3 may be optionally substituted (on an available carbon atom) by up to three substituents independently selected from C_{1-4}alkyl, C_{1-4}alkoxy, C_{1-4}alkanoyl, carboxy, hydroxy, halo, cyano, amino, *N*-C_{1-4}alkylamino, *N,N*-di-C_{1-4}alkylamino, C_{1-4}alkanoylamino, mercapto, C_{1-4}alkylsulphonyl, C_{1-4}alkylsulphinyl, C_{1-4}alkylsulphanyl, nitro, trifluoromethylC_{1-4}alkyl, phenyl, C_{1-4}alkoxyphenyl, heteroaryl, heteroarylC_{1-4}alkyl, aminosulphonylphenyl or C_{1-4}alkoxycarbonyl; and

R_4 is hydrogen, C_{1-4}alkyl, or nitro;

or a pharmaceutically acceptable salt, prodrug or solvate thereof;

with the proviso that compound of formula **(I)** is not selected from:

Hydrazinecarboxamide, *N*-(9-ethyl-9H-carbazol-3-yl)-;

Urea, (9-ethyl-9H-carbazol-3-yl)-;

Urea, 9H-carbazol-2-yl-;

Urea, *N*-(9-ethyl-9H-carbazol-3-yl)-N'-1-naphthalenyl-, or

Urea, *N*-[3-(diethylamino)propyl]-N'-(9-ethyl-9H-carbazol-3-yl)-.

According to an alternative further third feature of the invention there is provided a compound of the formula **(III')** (as depicted above) wherein:

R_1 is selected from hydrogen, C_{1-6}alkyl, C_{1-4}alkoxyC_{1-4}alkyl, C_{1-6}alkanoyl, C_{1-4}alkanoylC_{1-4}alkyl, aryl, arylC_{1-4}alkyl, arylC_{1-4}alkoxyC_{1-4}alkyl, arylC_{1-4}alkanoyl, arylcarbonyl, heteroaryl, heteroarylC_{1-4}alkyl, heteroarylC_{1-4}alkoxyC_{1-4}alkyl, heteroarylC_{1-4}alkanoyl, heteroarylcarbonyl, heterocyclyl, heterocyclylC_{1-4}alkyl, heterocyclylC_{1-4}alkoxyC_{1-4}alkyl, heterocyclylC_{1-4}alkanoyl, heterocyclylcarbonyl, carbocyclyl, carbocyclylC_{1-4}alkyl, carbocyclylC_{1-4}alkoxyC_{1-4}alkyl, carbocyclylC_{1-4}alkanoyl, carbocyclylcarbonyl, cyanoC_{1-4}alkyl, aminoC_{1-4}alkyl, *N*-C_{1-4}alkylaminoC_{1-4}alkyl, or *N,N*-di-C_{1-4}alkylaminoC_{1-4}alkyl; wherein R_1 may be optionally substituted (on an available carbon atom) by up to three substituents independently selected from: C_{1-4}alkyl, C_{1-4}alkoxy, C_{1-4}alkanoyl, carboxy, hydroxy, halo, cyano, amino, *N*-C_{1-4}alkylamino, *N,N*-di-C_{1-4}alkylamino, C_{1-4}alkanoylamino, mercapto, C_{1-4}alkylsulphonyl, C_{1-4}alkylsulphinyl, C_{1-4}alkylsulphanyl, nitro, trifluoromethyl-C_{1-4}alkyl, heteroarylC_{1-4}alkanoylamino, or C_{1-4}alkoxycarbonyl;

R_2 is selected from hydrogen, C_{1-4}alkyl, C_{1-4}alkoxy, cyano, nitro, halo, amino, *N*-C_{1-4}alkylamino, or *N,N*-di-C_{1-4}alkylamino;

L_1 is selected from hydrogen or C_{1-4}alkyl;

L_2 is selected from hydrogen or C_{1-4}alkyl;

B is C_{1-6}alkylene, C_{2-6}alkenylene, C_{2-6}alkynylene, or a direct bond;

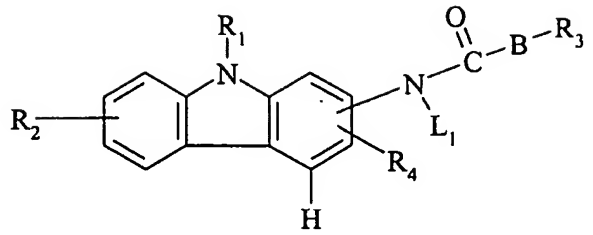
R_3 is hydrogen, C_{1-6}alkoxy, C_{1-6}alkanoyl, C_{1-6}alkoxycarbonyl, aryl, aryloxy, arylC_{1-4}alkoxy, arylcarbonyl, aryl$_{1-4}$alkanoyl, aryloxycarbonyl, arylC_{1-4}alkoxycarbonyl, heteroaryl, heteroaryloxy, heteroarylC_{1-4}alkoxy, heteroarylcarbonyl, heteroarylC_{1-4}alkanoyl, heteroaryloxycarbonyl, heteroaryl-C_{1-4}alkoxycarbonyl, heterocyclyl, heterocyclyloxy, heterocyclylC_{1-4}alkoxy, heterocyclylcarbonyl, heterocyclylC_{1-4}alkanoyl, heterocyclyloxycarbonyl, heterocyclylC_{1-4}alkoxycarbonyl, carbocyclyl, carbocyclyloxy, carbocyclylC_{1-4}alkoxy, carbocyclylcarbonyl, carbocyclylC_{1-4}alkanoyl, carbocyclyloxycarbonyl, carbocyclylC_{1-4}alkoxycarbonyl, amino, *N*-C_{1-4}alkylamino, *N,N*-di-C_{1-4}alkylamino, C_{1-4}alkyl)thio or fluoro wherein R_3 may be optionally substituted (on an available carbon atom) by up to three substituents independently selected from C_{1-4}alkyl, C_{1-4}alkoxy, C_{1-4}alkanoyl, carboxy, hydroxy, halo, cyano, amino, *N*-C_{1-4}alkylamino, *N,N*-di-C_{1-4}alkylamino, C_{1-4}alkanoylamino, mercapto, C_{1-4}alkylsulphonyl, C_{1-4}alkylsulphinyl, C_{1-4}alkylsulphanyl, nitro, trifluoromethylC_{1-4}alkyl, phenyl, C_{1-4}alkoxyphenyl, heteroaryl, heteroarylC_{1-4}alkyl, aminosulphonylphenyl or C_{1-4}alkoxycarbonyl; and

R_4 is hydrogen, C_{1-4}alkyl, or nitro;

or a pharmaceutically acceptable salt, prodrug or solvate thereof;

with the proviso that when -N(L_1)- is linked on the 2-position of the carbazole ring, R_1 is hydrogen, R_2 is hydrogen, B is a direct bond, L_1 is hydrogen, L_2 is hydrogen and R_4 is hydrogen then R_3 cannot be hydrogen; and when -N(L_1)- is linked on the 3-position of the carbazole ring, R_1 is ethyl, R_2 is hydrogen, B is a direct bond or -$CH_2)_3$-, L_1 is hydrogen, L_2 is hydrogen and R_4 is hydrogen then R_3 cannot be hydrogen, amino, *N,N*-diethylamino or naphth-1-yl.

According to a fourth feature of the invention there is provided a compound of the formula (IV):



(IV)

wherein:

$\mathbf{R_1}$ is selected from hydrogen, C_{1-6}alkyl, C_{1-4}alkoxyC_{1-4}alkyl, C_{1-6}alkanoyl, C_{1-4}alkanoylC_{1-4}alkyl, aryl, arylC_{1-4}alkyl, arylC_{1-4}alkoxyC_{1-4}alkyl, arylC_{1-4}alkanoyl, arylcarbonyl, heteroaryl, heteroarylC_{1-4}alkyl, heteroarylC_{1-4}alkoxyC_{1-4}alkyl, heteroarylC_{1-4}alkanoyl, heteroarylcarbonyl, heterocyclyl, heterocyclylC_{1-4}alkyl, heterocyclylC_{1-4}alkoxyC_{1-4}alkyl, heterocyclylC_{1-4}alkanoyl, heterocyclylcarbonyl, carbocyclyl, carbocyclylC_{1-4}alkyl, carbocyclylC_{1-4}alkoxyC_{1-4}alkyl, carbocyclylC_{1-4}alkanoyl, carbocyclylcarbonyl, C_{1-4}alkylsulphonyl, *N,N*-di-C_{1-4}alkylaminosulphonyl or *N*-C_{1-4}alkylaminosulphonyl wherein R_1 may be optionally substituted (on an available carbon atom) by up to three substituents independently selected from: C_{1-4}alkyl optionally substituted by up to three fluoro substituents, C_{1-4}alkoxy, C_{1-4}alkanoyl, carboxy, hydroxy, halo, cyano, amino, *N*-C_{1-4}alkylamino, *N,N*-di-C_{1-4}alkylamino, C_{1-4}alkanoylamino, mercapto, C_{1-4}alkylsulphonyl, C_{1-4}alkylsulphinyl, C_{1-4}alkylsulphanyl, nitro, heteroarylC_{1-4}alkanoylamino, or C_{1-4}alkoxycarbonyl;

$\mathbf{R_2}$ is selected from hydrogen, C_{1-4}alkyl (optionally substituted by hydroxy), C_{1-4}alkoxy, cyano, nitro, halo, amino, *N*-C_{1-4}alkylamino, or *N,N*-di-C_{1-4}alkylamino;

$\mathbf{L_1}$ is selected from hydrogen or C_{1-4}alkyl;

B is selected from C_{1-10}alkylene, C_{2-10}alkenylene, C_{2-10}alkynylene, or a direct bond wherein the alkylene, alkenylene and alkynylene chains are optionally substituted by hydroxy, C_{1-4}alkoxy or amino;

$\mathbf{R_3}$ is selected from hydrogen, hydroxy, C_{1-6}alkoxy, C_{1-6}alkanoyl, C_{1-6}alkanoyloxy, C_{1-6}alkanoylamino, C_{1-6}alkoxycarbonyl, aryl, aryloxy, arylcarbonyl, arylC_{1-4}alkyl, arylC_{1-4}alkoxy, arylC_{1-4}alkanoyl, aryloxycarbonyl, arylC_{1-4}alkoxycarbonyl, arylamino, diarylamino, arylsulphonyl, heteroaryl, heteroaryloxy, heteroarylC_{1-4}alkoxy, heteroarylcarbonyl, heteroarylC_{1-4}alkanoyl, heteroaryloxycarbonyl,

heteroarylC_{1-4}alkoxycarbonyl, heteroarylC_{1-4}alkyl, heteroarylamino, heteroarylsulphonyl, diheteroarylamino, heterocyclyl, heterocyclyloxy, heterocyclylC_{1-4}alkoxy, heterocyclylcarbonyl, heterocyclylC_{1-4}alkanoyl, heterocyclyloxycarbonyl, heterocyclylC_{1-4}alkoxycarbonyl, heterocyclylC_{1-4}alkyl, heterocyclylamino, diheterocyclylamino, heterocyclylsulphonyl, carbocyclyl, carbocyclyloxy, carbocyclylC_{1-4}alkoxy, carbocyclylcarbonyl, carbocyclylC_{1-4}alkanoyl, carbocyclyloxycarbonyl, carbocyclylC_{1-4}alkoxycarbonyl, carbocyclylC_{1-4}alkyl, carbocyclylamino, carbocyclylsulphonyl, dicarbocyclylamino, cyano, carbamoyl, ureido, amino, *N*-C_{1-4}alkylamino, *N,N*-di-C_{1-4}alkylamino, C_{1-4}alkoxycarbonylamino, carbamoyl, *N*-C_{1-4}alkylcarbamoyl, *N,N*-di-C_{1-4}alkylcarbamoyl, C_{1-4}alkylsulphanyl, C_{1-4}alkylsulphinyl, C_{1-4}alkylsulphonyl, trifluoromethyl or fluoro wherein R_3 may be optionally substituted by up to three substituents independently selected from C_{1-4}alkyl, hydroxyC_{1-4}alkyl, C_{1-4}alkoxy, C_{1-6}alkoxycarbonyl, C_{2-6}alkenyloxycarbonyl, C_{1-4}alkanoyl, C_{1-4}alkanoylamino, C_{1-4}alkanoylthio, oxo, carboxy, hydroxy, halo, cyano, amino, *N*-C_{1-4}alkylamino, *N,N*-di-C_{1-4}alkylamino, *N*-C_{1-4}alkylaminoC$_{1-4}$alkyl, *N,N*-di-C_{1-4}alkylaminoC$_{1-4}$alkyl, carbamoyl, *N*-C_{1-4}alkylcarbamoyl, *N,N*-di-C_{1-4}alkylcarbamoyl, mercapto, C_{1-4}alkylsulphonyl, C_{1-4}alkylsulphinyl, C_{1-4}alkylsulphanyl, C_{1-4}alkylsulphonyloxyC_{1-4}alkyl, nitro, trifluoromethyl, trifluoromethylC_{1-4}alkyl, C_{1-6}alkoxycarbonylamino, C_{1-6}alkoxycarbonyl(N-C_{1-4}alkyl)amino, aryl (optionally substituted by one C_{1-4}alkoxy or sulphamoyl), arylC_{1-4}alkyl, aryloxyC_{1-4}alkyl, arylcarbonyl, heteroaryl, heteroarylC_{1-4}alkyl, heteroaryloxyC_{1-4}alkyl, heteroarylcarbonyl, heterocyclyl, heterocyclylC_{1-4}alkyl, heterocyclyloxyC_{1-4}alkyl, heterocyclylcarbonyl, carbocyclyl, carbocyclylC_{1-4}alkyl, carbocyclyloxyC_{1-4}alkyl or carbocyclylcarbonyl; and

R_4 is selected from hydrogen, C_{1-4}alkyl, halo or nitro;

or a pharmaceutically acceptable salt, prodrug or solvate thereof;

with the proviso that when -N(L_1)- is linked on the 2-position of the carbazole ring, R_1 is hydrogen, methyl, acetyl, (4-methyl-1-piperazinyl)propyl or 2-methoxy-4-carboxy-benzyl, R_2 is hydrogen, 6-ethyl, 6-bromo or 6-nitro, L_1 is hydrogen, B is a direct bond, -CH_2-, -$CH(CH_3)CH_2$- or -$(CH_2)_5$- and R_4 is hydrogen or nitro then R_3 cannot be hydrogen or cyclopentyl; when -N(L_1)- is linked on the 3-position of the carbazole ring, R_1 is hydrogen, methyl, ethyl, acetyl, 2-carboxyethyl or benzoyl, R_2 is hydrogen, 6-methyl, 6-methoxy, 7-methoxy, 6-nitro or 6-amino, L_1 is hydrogen or ethyl, B is -CH_2- and R_4 is hydrogen, methyl

or nitro, then R_3 cannot be hydrogen; when -N(L_1)- is linked on the 3-position of the carbazole ring, R_1 is hydrogen, methyl or ethyl, R_2 is hydrogen; L_1 is hydrogen, B is a direct bond, -C_2H_4-, -$CH(CH_3)CH_2$-, -CH=CH- or -$C(=CH_2)CH_2$-, R_4 is hydrogen then R_3 cannot be hydrogen; when -N(L_1)- is linked on the 3-position of the carbazole ring, R_1 is hydrogen or ethyl, R_2 is hydrogen, L_1 is hydrogen or ethyl, B is a direct bond and R_4 is hydrogen then R_3 cannot be unsubstituted phenyl, 2-carboxyphenyl, 4-nitro-phenyl or 2-hydroxy-5-amino-phenyl; when -N(L_1)- is linked on the 3-position of the carbazole ring R_1 is hydrogen, R_2 is hydrogen, L_1 is hydrogen, B is -CH_2- and R_4 is hydrogen then R_3 cannot be phenoxy; when -N(L_1)- is linked on the 3-position of the carbazole ring, R_1 is hydrogen , methyl or 2-cyanoethyl, R_2 is hydrogen, L_1 is hydrogen, B is a direct bond, and R_4 is hydrogen then R_3 cannot be 3-hydroxy-2-naphthyl or 2-hydroxy-1-naphthyl; when -N(L_1)- is linked on the 3-position of the carbazole ring, R_1 is ethyl, R_2 is hydrogen, L_1 is hydrogen, B is a bond and R_4 is hydrogen then R_3 cannot be 4,5,6,7-terahydro-1H-benzimidazol-6-yl or 1H-benzo[d][1,2,3]triazol-6-yl; and when R_1 is hydrogen, methyl, ethyl, carboxymethyl or 2-carboxyethyl, R_2 is hydrogen, L_1 is hydrogen, B is a direct bond, -CH_2- or -$CH(CH_3)$- and R_4 is hydrogen then R_3 cannot be amino, halo or trifluoromethyl.

According to a fourth feature of the invention there is provided a compound of the formula **(IV)** (as depicted above) wherein:

R_1 is selected from hydrogen, C_{1-6}alkyl, C_{1-4}alkoxyC_{1-4}alkyl, C_{1-6}alkanoyl, C_{1-4}alkanoylC_{1-4}alkyl, aryl, arylC_{1-4}alkyl, arylC_{1-4}alkoxyC_{1-4}alkyl, arylC_{1-4}alkanoyl, arylcarbonyl, heteroaryl, heteroarylC_{1-4}alkyl, heteroarylC_{1-4}alkoxyC_{1-4}alkyl, heteroarylC_{1-4}alkanoyl, heteroarylcarbonyl, heterocyclyl, heterocyclylC_{1-4}alkyl, heterocyclylC_{1-4}alkoxyC_{1-4}alkyl, heterocyclylC_{1-4}alkanoyl, heterocyclylcarbonyl, carbocyclyl, carbocyclylC_{1-4}alkyl, carbocyclylC_{1-4}alkoxyC_{1-4}alkyl, carbocyclylC_{1-4}alkanoyl, carbocyclylcarbonyl, C_{1-4}alkylsulphonyl, *N,N*-di-C_{1-4}alkylaminosulphonyl or *N*-C_{1-4}alkylaminosulphonyl wherein R_1 may be optionally substituted (on an available carbon atom) by up to three substituents independently selected from: C_{1-4}alkyl optionally substituted by up to three fluoro substituents, C_{1-4}alkoxy, C_{1-4}alkanoyl, carboxy, hydroxy, halo, cyano, amino, *N*-C_{1-4}alkylamino, *N,N*-di-C_{1-4}alkylamino, C_{1-4}alkanoylamino, mercapto, C_{1-4}alkylsulphonyl, C_{1-4}alkylsulphinyl, C_{1-4}alkylsulphanyl, nitro, heteroarylC_{1-4}alkanoylamino, or C_{1-4}alkoxycarbonyl;

L_1 is hydrogen or C_{1-4}alkyl;

B is C_{1-10}alkylene, C_{2-10}alkenylene, C_{2-10}alkynylene, or a direct bond wherein the alkylene, alkenylene and alkynylene chains are optionally substituted by hydroxy, C_{1-4}alkoxy or amino;

R_3 is hydrogen, hydroxy, C_{1-6}alkoxy, C_{1-6}alkanoyl, C_{1-6}alkanoyloxy, C_{1-6}alkanoylamino, C_{1-6}alkoxycarbonyl, C_{1-4}alkoxycarbonylamino; aryl, aryloxy, arylcarbonyl, arylC_{1-4}alkyl; arylC_{1-4}alkoxy, arylC_{1-4}alkanoyl, aryloxycarbonyl, arylC_{1-4}alkoxycarbonyl, arylamino, heteroaryl, heteroaryloxy, heteroarylC_{1-4}alkoxy, heteroarylcarbonyl, heteroarylC_{1-4}alkanoyl, heteroaryloxycarbonyl, heteroarylC_{1-4}alkoxycarbonyl, heterocyclyl, heterocyclyloxy, heterocyclylC_{1-4}alkoxy, heterocyclylcarbonyl, heterocyclylC_{1-4}alkanoyl, heterocyclyloxycarbonyl, heterocyclylC_{1-4}alkoxycarbonyl, carbocyclyl, carbocyclyloxy, carbocyclylC_{1-4}alkoxy, carbocyclylcarbonyl, carbocyclylC_{1-4}alkanoyl, carbocyclyloxycarbonyl, carbocyclylC_{1-4}alkoxycarbonyl, cyano, carbamoyl, ureido, amino, *N*-C_{1-4}alkylamino, *N,N*-di-C_{1-4}alkylamino, C_{1-4}alkoxycarbonylamino, aminocarbonyl, *N*-C_{1-4}alkylaminocarbonyl, *N,N*-di-C_{1-4}alkylaminocarbonyl, C_{1-4}alkylthio, trifluoromethyl or fluoro wherein R_3 may be optionally substituted by up to three substituents independently selected from C_{1-4}alkyl, hydroxyC_{1-4}alkyl, C_{1-4}alkoxy, C_{1-6}alkoxycarbonyl, C_{1-6}alkenyloxycarbonyl, C_{1-4}alkanoyl, C_{1-4}alkanoylamino, C_{1-4}alkanoylthio, oxo, carboxy, hydroxy, halo, cyano, amino, *N*-C_{1-4}alkylamino, *N,N*-di-C_{1-4}alkylamino, *N*-C_{1-4}alkylaminoC_{1-4}alkyl, *N,N*-di-C_{1-4}alkylaminoC_{1-4}alkyl, aminocarbonyl, *N*-C_{1-4}alkylaminocarbonyl, *N,N*-di-C_{1-4}alkylaminocarbonyl, mercapto, C_{1-4}alkylsulphonyl, C_{1-4}alkylsulphinyl, C_{1-4}alkylsulphanyl, nitro, trifluoromethyl, trifluoromethylC_{1-4}alkyl, aryl, arylC_{1-4}alkyl, aryloxyC_{1-4}alkyl, C_{1-4}alkoxyphenyl, heteroaryl, heteroarylC_{1-4}alkyl, heterocyclylcarbonyl, or aminosulphonylphenyl; and

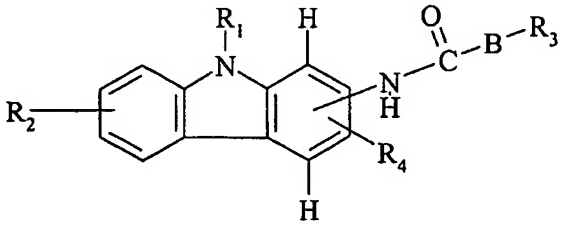
R_4 is hydrogen, C_{1-4}alkyl, halo or nitro;

or a pharmaceutically acceptable salt, prodrug or solvate thereof;

with the proviso that when -N(L_1)- is linked on the 2-position of the carbazole ring, R_1 is hydrogen, methyl, acetyl, (4-methyl-1-piperazinyl)propyl or 2-methoxy-4-carboxy-benzyl, R_2 is hydrogen, 6-ethyl, 6-bromo or 6-nitro, L_1 is hydrogen, B is a direct bond, -CH_2-, -$CHCH_3$)CH_2- or -CH_2)$_5$- and R_4 is hydrogen or nitro then R_3 cannot be hydrogen or cyclopentyl; when -N(L_1)- is linked on the 3-position of the carbazole ring, R_1 is hydrogen,

methyl, ethyl, acetyl, 2-carboxyethyl or benzoyl, R_2 is hydrogen, 6-methyl, 6-methoxy, 7-methoxy, 6-nitro or 6-amino, L_1 is hydrogen or ethyl, B is $-CH_2-$ and R_4 is hydrogen, methyl or nitro, then R_3 cannot be hydrogen; when $-N(L_1)-$ is linked on the 3-position of the carbazole ring, R_1 is hydrogen, methyl or ethyl, R_2 is hydrogen; L_1 is hydrogen, B is a direct bond, $-C_2H_4-$, $-CHCH_3)CH_2-$, $-CH=CH-$ or $-C(=CH_2)CH_2-$, R_4 is hydrogen then R_3 cannot be hydrogen; when $-N(L_1)-$ is linked on the 3-position of the carbazole ring, R_1 is hydrogen or ethyl, R_2 is hydrogen, L_1 is hydrogen or ethyl, B is a direct bond and R_4 is hydrogen then R_3 cannot be unsubstituted phenyl, 2-carboxyphenyl, 4-nitro-phenyl or 2-hydroxy-5-amino-phenyl; when $-N(L_1)-$ is linked on the 3-position of the carbazole ring R_1 is hydrogen, R_2 is hydrogen, L_1 is hydrogen, B is $-CH_2-$ and R_4 is hydrogen then R_3 cannot be phenoxy; when $-N(L_1)-$ is linked on the 3-position of the carbazole ring, R_1 is hydrogen , methyl or 2-cyanoethyl, R_2 is hydrogen, L_1 is hydrogen, B is a direct bond, and R_4 is hydrogen then R_3 cannot be 3-hydroxy-2-naphthyl or 2-hydroxy-1-naphthyl; when $-N(L_1)-$ is linked on the 3-position of the carbazole ring, R_1 is ethyl, R_2 is hydrogen, L_1 is hydrogen, B is a bond and R_4 is hydrogen then R_3 cannot be 4,5,6,7-terahydro-1H-benzimidazol-6-yl or 1H-benzo[d][1,2,3]triazol-6-yl; and when R_1 is hydrogen, methyl, ethyl, carboxymethyl or 2-carboxyethyl, R_2 is hydrogen, L_1 is hydrogen, B is a direct bond, $-CH_2-$ or $-CHCH_3)-$ and R_4 is hydrogen then R_3 cannot be amino, halo or trifluoromethyl.

According to a fourth feature of the invention there is provided a compound of the formula **(IV')**:



(IV')

wherein:

R_1 is selected from hydrogen, C_{1-6}alkyl, C_{1-4}alkoxyC_{1-4}alkyl, C_{1-6}alkanoyl, C_{1-4}alkanoylC_{1-4}alkyl, aryl, arylC_{1-4}alkyl, arylC_{1-4}alkoxyC_{1-4}alkyl, arylC_{1-4}alkanoyl, arylcarbonyl, heteroaryl, heteroarylC_{1-4}alkyl, heteroarylC_{1-4}alkoxyC_{1-4}alkyl, heteroarylC_{1-4}alkanoyl, heteroarylcarbonyl, heterocyclyl, heterocyclylC_{1-4}alkyl, heterocyclylC_{1-4}alkoxyC_{1-4}alkyl, heterocyclylC_{1-4}alkanoyl, heterocyclylcarbonyl, carbocyclyl,

carbocyclylC_{1-4}alkyl, carbocyclylC_{1-4}alkoxyC_{1-4}alkyl, carbocyclylC_{1-4}alkanoyl, carbocyclylcarbonyl, cyanoC_{1-4}alkyl, aminoC_{1-4}alkyl, *N*-C_{1-4}alkylaminoC_{1-4}alkyl, or *N,N*-di-C_{1-4}alkylaminoC_{1-4}alkyl; wherein R_1 may be optionally substituted (on an available carbon atom) by up to three substituents independently selected from: C_{1-4}alkyl, C_{1-4}alkoxy, C_{1-4}alkanoyl, carboxy, hydroxy, halo, cyano, amino, *N*-C_{1-4}alkylamino, *N,N*-di-C_{1-4}alkylamino, C_{1-4}alkanoylamino, mercapto, C_{1-4}alkylsulphonyl, C_{1-4}alkylsulphinyl, C_{1-4}alkylsulphanyl, nitro, trifluoromethyl-C_{1-4}alkyl, heteroarylC_{1-4}alkanoylamino, or C_{1-4}alkoxycarbonyl;

R_2 is selected from hydrogen, C_{1-4}alkyl, C_{1-4}alkoxy, cyano, nitro, halo, amino, *N*-C_{1-4}alkylamino, or *N,N*-di-C_{1-4}alkylamino;

B is C_{1-6}alkylene, C_{2-6}alkenylene, C_{2-6}alkynylene, or a direct bond;

R_3 is hydrogen, C_{1-6}alkoxy, C_{1-6}alkanoyl, C_{1-6}alkoxycarbonyl, aryl, aryloxy, aryl-C_{1-4}alkoxy, arylcarbonyl, aryl$_{1-4}$alkanoyl, aryloxycarbonyl, arylC_{1-4}alkoxycarbonyl, heteroaryl, heteroaryloxy, heteroarylC_{1-4}alkoxy, heteroarylcarbonyl, heteroaryl-C_{1-4}alkanoyl, heteroaryloxycarbonyl, heteroarylC_{1-4}alkoxycarbonyl, heterocyclyl, heterocyclyloxy, heterocyclylC_{1-4}alkoxy, heterocyclylcarbonyl, heterocyclylC_{1-4}alkanoyl, heterocyclyloxycarbonyl, heterocyclylC_{1-4}alkoxycarbonyl, carbocyclyl, carbocyclyloxy, carbocyclylC_{1-4}alkoxy, carbocyclylcarbonyl, carbocyclylC_{1-4}alkanoyl, carbocyclyloxycarbonyl, carbocyclylC_{1-4}alkoxycarbonyl, amino, *N*-C_{1-4}alkylamino, *N,N*-di-C_{1-4}alkylamino, C_{1-4}alkyl)thio wherein R_3 may be optionally substituted (on an available carbon atom) by up to three substituents independently selected from C_{1-4}alkyl, C_{1-4}alkoxy, C_{1-4}alkanoyl, carboxy, hydroxy, halo, cyano, amino, *N*-C_{1-4}alkylamino, *N,N*-di-C_{1-4}alkylamino, C_{1-4}alkanoylamino, mercapto, C_{1-4}alkylsulphonyl, C_{1-4}alkylsulphinyl, C_{1-4}alkylsulphanyl, nitro, trifluoromethylC_{1-4}alkyl, phenyl, C_{1-4}alkoxyphenyl, heteroaryl, heteroarylC_{1-4}alkyl, aminosulphonylphenyl or C_{1-4}alkoxycarbonyl; and

R_4 is hydrogen, C_{1-4}alkyl, or nitro;

or a pharmaceutically acceptable salt, prodrug or solvate thereof;

with the proviso that compound of formula **(I)** is not selected from:

Acetamide, *N*-9H-carbazol-3-yl-2-phenoxy-;

Acetamide, *N*-[9-[3-(4-methyl-1-piperazinyl)propyl]-9H-carbazol-2-yl]-, dihydrochloride;

Formamide, *N*-(9-methyl-9H-carbazol-3-yl)-;

Acetamide, *N*-(9-acetyl-3-nitro-9H-carbazol-2-yl)-;

2-Propenamide, *N*-(9-ethyl-9H-carbazol-3-yl)-2-methyl-, homopolymer;

1-Naphthamide, 2-hydroxy-*N*-(9-methylcarbazol-3-yl)-;

Acetamide, 2,2,2-trifluoro-*N*-(9-methyl-9H-carbazol-3-yl)-;

Acetamide, *N*-[9-[3-(4-methyl-1-piperazinyl)propyl]-9H-carbazol-2-yl]-;

Acetamide, *N*-ethyl-*N*-(9-ethyl-9H-carbazol-3-yl)-;

2-Naphthamide, *N*-[9-(2-cyanoethyl)carbazol-3-yl]-3-hydroxy-;

Formamide, *N*-9H-carbazol-3-yl-;

2-Propenamide, *N*-(9-ethyl-9H-carbazol-3-yl)-, homopolymer;

N-(9-ethyl-9H-carbazol-3-yl)-2-methyl-2-propenamide (9CI);

Acetamide, *N*-(6-bromo-9H-carbazol-2-yl)-;

2-Propenamide, *N*-(9-ethyl-9H-carbazol-3-yl)-2-methyl-;

Butanamide, *N*-9H-carbazol-2-yl-;

Acetamide, *N*-(2-nitro-9H-carbazol-3-yl)-;

2-Propenamide, *N*-(9-ethyl-9H-carbazol-3-yl)- (9CI);

Benzamide, *N*-ethyl-*N*-(9-ethyl-9H-carbazol-3-yl)-4-nitro-;

Formamide, *N*-9H-carbazol-2-yl-;

Butanamide, *N*-(5,8-dimethyl-6-nitro-9H-carbazol-3-yl)-;

Acetamide, *N*-(9-benzoyl-2-nitro-9H-carbazol-3-yl)-;

Propanamide, *N*-(5,8-dimethyl-6-nitro-9H-carbazol-3-yl)-;

Acetamide, *N*-(9-acetyl-2-nitro-9H-carbazol-3-yl)-;

Benzoic acid, 4-[[6-ethyl-2-[(1-oxohexylamino]-9H-carbazol-9-yl]methyl]-3-methoxy-;

Acetamide, *N*-(9-benzoyl-9H-carbazol-3-yl)-;

Acetamide, *N*-(7-methoxy-9H-carbazol-3-yl)-;

Benzoic acid, 4-[[2-[(cyclopentylacetylamino]-9H-carbazol-9-yl]methyl]-3-methoxy-, methyl ester ;

Acetamide, *N*-(5,8-dimethyl-6-nitro-9H-carbazol-3-yl)-;

Acetamide, *N*-(9-acetyl-9H-carbazol-3-yl)-;

Benzamide, *N*-(9-ethyl-9H-carbazol-3-yl)-;

Benzamide, 5-amino-*N*-9H-carbazol-3-yl-2-hydroxy-;

Acetamide, *N*-9H-carbazol-3-yl-;

Benzenesulfonic acid, 2-[[(9-ethyl-9H-carbazol-3-ylamino]carbonyl]-;

1H-Benzimidazole-5-carboxamide, *N*-(9-ethyl-9H-carbazol-3-yl)-4,5,6,7-tetrahydro-;

Benzoic acid, 4-[[2-[(cyclopentylcarbonylamino]-9H-carbazol-9-yl]methyl]- 3-methoxy-, methyl ester ;

Acetamide, *N*-(5,8-dimethyl-9H-carbazol-2-yl)-;

Acetamide, *N*-(9-acetyl-9H-carbazol-2-yl)-;

Benzoic acid, 2-[[(9-ethyl-9H-carbazol-3-ylamino]carbonyl]-;

2-Naphthalenecarboxamide, *N*-9H-carbazol-2-yl-3-hydroxy-;

1H-Benzotriazole-5-carboxamide, *N*-(9-ethyl-9H-carbazol-3-yl)-;

2-Propenamide, *N*-9H-carbazol-3-yl-, homopolymer;

Acetamide, *N*-(6-methoxy-9H-carbazol-3-yl)-;

Propionamide, 2-amino-*N*-9-ethylcarbazol-2-yl-, hydrochloride;

Propionamide, 2-amino-*N*-carbazol-3-yl-;

Acetamide, *N*-(6-amino-9-ethyl-9H-carbazol-3-yl)-;

2-Propenamide, *N*-9H-carbazol-3-yl-;

Propanamide, *N*-9H-carbazol-3-yl-2-iodo-;

Acetamide, *N*-(9-ethyl-6-methyl-9H-carbazol-3-yl)-;

Benzamide, *N*-9H-carbazol-3-yl-;

2-Naphthamide, *N*-carbazol-3-yl-3-hydroxy-;

Acetamide, *N*-(9-ethyl-6-nitro-9H-carbazol-3-yl)-;

Acetamide, *N*-9H-carbazol-3-yl-2-iodo-;

Diphenamic acid, *N*-(9-ethylcarbazol-3-yl)-;

5-Pyrimidinecarboxamide,

N-(9-ethyl-9H-carbazol-3-yl)-1,2,3,4-tetrahydro-6-methyl-2-oxo-4-thioxo-;

Acetamide, *N*-(9-methyl-9H-carbazol-3-yl)-;

Acetamide, *N*-(2-methyl-9H-carbazol-3-yl)-;

Acetamide, *N*-(9-methyl-3,6-dinitro-9H-carbazol-2-yl)-;

Formamide, *N*-(9-ethyl-9H-carbazol-3-yl)-;

Acetamide, *N*-(9-methyl-9H-carbazol-3-yl)-, monohydrochloride;

Acetamide, 2-bromo-*N*-9H-carbazol-3-yl-;

2-Naphthamide, 3-hydroxy-*N*-(9-methylcarbazol-3-yl)-;

Acetamide, *N*-(9-methyl-9H-carbazol-2-yl)-;

Acetamide, *N*-9H-carbazol-2-yl-;

Acetamide, *N*-9H-carbazol-3-yl-2-fluoro-;

Acetamide, *N*-(9-ethyl-9H-carbazol-3-yl)-, or

Acetamide, 2,2,2-trifluoro-*N*-(9-methyl-9H-carbazol-2-yl)-

According to a fourth feature of the invention there is provided a compound of the formula (IV') (as depicted above) wherein:

$\mathbf{R_1}$ is selected from hydrogen, C_{1-6}alkyl, C_{1-4}alkoxyC_{1-4}alkyl, C_{1-6}alkanoyl, C_{1-4}alkanoylC_{1-4}alkyl, aryl, arylC_{1-4}alkyl, arylC_{1-4}alkoxyC_{1-4}alkyl, arylC_{1-4}alkanoyl, arylcarbonyl, heteroaryl, heteroarylC_{1-4}alkyl, heteroarylC_{1-4}alkoxyC_{1-4}alkyl, heteroarylC_{1-4}alkanoyl, heteroarylcarbonyl, heterocyclyl, heterocyclylC_{1-4}alkyl, heterocyclylC_{1-4}alkoxyC_{1-4}alkyl, heterocyclylC_{1-4}alkanoyl, heterocyclylcarbonyl, carbocyclyl, carbocyclylC_{1-4}alkyl, carbocyclylC_{1-4}alkoxyC_{1-4}alkyl, carbocyclylC_{1-4}alkanoyl, carbocyclylcarbonyl, cyanoC_{1-4}alkyl, aminoC_{1-4}alkyl, *N*-C_{1-4}alkylaminoC_{1-4}alkyl, or *N,N*-di-C_{1-4}alkylaminoC_{1-4}alkyl; wherein R_1 may be optionally substituted (on an available carbon atom) by up to three substituents independently selected from: C_{1-4}alkyl, C_{1-4}alkoxy, C_{1-4}alkanoyl, carboxy, hydroxy, halo, cyano, amino, *N*-C_{1-4}alkylamino, *N,N*-di-C_{1-4}alkylamino, C_{1-4}alkanoylamino, mercapto, C_{1-4}alkylsulphonyl, C_{1-4}alkylsulphinyl, C_{1-4}alkylsulphanyl, nitro, trifluoromethyl-C_{1-4}alkyl, heteroarylC_{1-4}alkanoylamino, or C_{1-4}alkoxycarbonyl;

$\mathbf{R_2}$ is selected from hydrogen, C_{1-4}alkyl, C_{1-4}alkoxy, cyano, nitro, halo, amino, *N*-C_{1-4}alkylamino, or *N,N*-di-C_{1-4}alkylamino;

$\mathbf{L_1}$ is hydrogen or C_{1-4}alkyl;

B is C_{1-6}alkylene, C_{2-6}alkenylene, C_{2-6}alkynylene, or a direct bond;

$\mathbf{R_3}$ is hydrogen, C_{1-6}alkoxy, C_{1-6}alkanoyl, C_{1-6}alkoxycarbonyl, aryl, aryloxy, aryl-C_{1-4}alkoxy, arylcarbonyl, aryl$_{1-4}$alkanoyl, aryloxycarbonyl, arylC_{1-4}alkoxycarbonyl, heteroaryl, heteroaryloxy, heteroarylC_{1-4}alkoxy, heteroarylcarbonyl, heteroaryl-C_{1-4}alkanoyl, heteroaryloxycarbonyl, heteroarylC_{1-4}alkoxycarbonyl, heterocyclyl, heterocyclyloxy, heterocyclylC_{1-4}alkoxy, heterocyclylcarbonyl, heterocyclylC_{1-4}alkanoyl, heterocyclyloxycarbonyl, heterocyclylC_{1-4}alkoxycarbonyl, carbocyclyl, carbocyclyloxy, carbocyclylC_{1-4}alkoxy, carbocyclylcarbonyl, carbocyclylC_{1-4}alkanoyl, carbocyclyloxycarbonyl, carbocyclylC_{1-4}alkoxycarbonyl, amino, *N*-C_{1-4}alkylamino, *N,N*-di-C_{1-4}alkylamino, C_{1-4}alkyl)thio or fluoro wherein R_3 may be optionally substituted (on

an available carbon atom) by up to three substituents independently selected from C_{1-4}alkyl, C_{1-4}alkoxy, C_{1-4}alkanoyl, carboxy, hydroxy, halo, cyano, amino, *N*-C_{1-4}alkylamino, *N,N*-di-C_{1-4}alkylamino, C_{1-4}alkanoylamino, mercapto, C_{1-4}alkylsulphonyl, C_{1-4}alkylsulphinyl, C_{1-4}alkylsulphanyl, nitro, trifluoromethylC_{1-4}alkyl, phenyl, C_{1-4}alkoxyphenyl, heteroaryl, heteroarylC_{1-4}alkyl, aminosulphonylphenyl or C_{1-4}alkoxycarbonyl; and

R_4 is hydrogen, C_{1-4}alkyl, or nitro;

or a pharmaceutically acceptable salt, prodrug or solvate thereof;

with the proviso that when -N(L_1)- is linked on the 2-position of the carbazole ring, R_1 is hydrogen, methyl, acetyl, (4-methyl-1-piperazinyl)propyl or 2-methoxy-4-carboxy-benzyl, R_2 is hydrogen, 6-ethyl, 6-bromo or 6-nitro, L_1 is hydrogen, B is a direct bond, -CH_2-, -$CHCH_3$)CH_2- or -CH_2)$_5$- and R_4 is hydrogen or nitro then R_3 cannot be hydrogen or cyclopentyl; when -N(L_1)- is linked on the 3-position of the carbazole ring, R_1 is hydrogen, methyl, ethyl, acetyl, 2-carboxyethyl or benzoyl, R_2 is hydrogen, 6-methyl, 6-methoxy, 7-methoxy, 6-nitro or 6-amino, L_1 is hydrogen or ethyl, B is -CH_2- and R_4 is hydrogen, methyl or nitro, then R_3 cannot be hydrogen; when -N(L_1)- is linked on the 3-position of the carbazole ring, R_1 is hydrogen, methyl or ethyl, R_2 is hydrogen; L_1 is hydrogen, B is a direct bond, -C_2H_4-, -$CHCH_3$)CH_2-, -CH=CH- or -C(=CH_2)CH_2-, R_4 is hydrogen then R_3 cannot be hydrogen; when -N(L_1)- is linked on the 3-position of the carbazole ring, R_1 is hydrogen or ethyl, R_2 is hydrogen, L_1 is hydrogen or ethyl, B is a direct bond and R_4 is hydrogen then R_3 cannot be unsubstituted phenyl, 2-carboxyphenyl, 4-nitro-phenyl or 2-hydroxy-5-amino-phenyl; when -N(L_1)- is linked on the 3-position of the carbazole ring R_1 is hydrogen, R_2 is hydrogen, L_1 is hydrogen, B is -CH_2- and R_4 is hydrogen then R_3 cannot be phenoxy; when -N(L_1)- is linked on the 3-position of the carbazole ring, R_1 is hydrogen , methyl or 2-cyanoethyl, R_2 is hydrogen, L_1 is hydrogen, B is a direct bond, and R_4 is hydrogen then R_3 cannot be 3-hydroxy-2-naphthyl or 2-hydroxy-1-naphthyl; when -N(L_1)- is linked on the 3-position of the carbazole ring, R_1 is ethyl, R_2 is hydrogen, L_1 is hydrogen, B is a bond and R_4 is hydrogen then R_3 cannot be 4,5,6,7-terahydro-1H-benzimidazol-6-yl or 1H-benzo[d][1,2,3]triazol-6-yl; and when R_1 is hydrogen, methyl, ethyl, carboxymethyl or 2-carboxyethyl, R_2 is hydrogen, L_1 is hydrogen, B is a direct bond, -CH_2- or -$CHCH_3$)- and R_4 is hydrogen then R_3 cannot be amino, halo or trifluoromethyl.

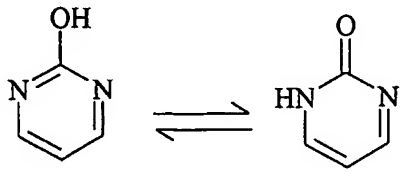
Particular compounds which fall within the above provisos include:

Benzoic acid, 4-[[6-ethyl-2-[(1-oxohexyl)amino]-9H-carbazol-9-yl]methyl]-3-methoxy-benzoic acid,

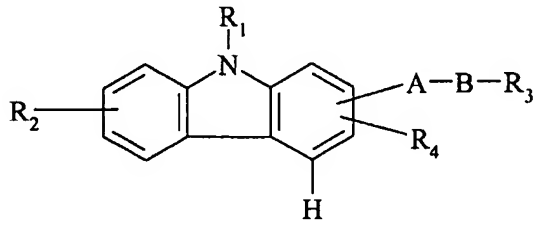
4-[[2-[(cyclopentylacetyl)amino]-9H-carbazol-9-yl]methyl]-3-methoxy-9H-carbazole-9-propanoic acid, 3-(acetylamino)-5-pyrimidinecarboxamide,

N-(9-ethyl-9H-carbazol-3-yl)-1,2,3,4-tetrahydro-6-methyl-2-oxo-4-thioxo-

For the avoidance of doubt compounds of the invention include any tautomeric forms of compounds which occur by virtue of substitution on heteroaryl and heterocyclyl rings. For example, a compound containing 2-hydroxypyrimidine would have 2 tautomers.



According to the fifth feature of the invention there is provided the use of a compound of formula **(Ia)**, or a pharmaceutically acceptable salt, prodrug or solvate thereof, for use in medical therapy,



(Ia)

wherein:

R_1 is selected from hydrogen, C_{1-6}alkyl, C_{1-4}alkoxyC_{1-4}alkyl, C_{1-6}alkanoyl, C_{1-4}alkanoylC_{1-4}alkyl, aryl, arylC_{1-4}alkyl, arylC_{1-4}alkoxyC_{1-4}alkyl, arylC_{1-4}alkanoyl, arylcarbonyl, heteroaryl, heteroarylC_{1-4}alkyl, heteroarylC_{1-4}alkoxyC_{1-4}alkyl, heteroarylC_{1-4}alkanoyl, heteroarylcarbonyl, heterocyclyl, heterocyclylC_{1-4}alkyl, heterocyclylC_{1-4}alkoxyC_{1-4}alkyl, heterocyclylC_{1-4}alkanoyl, heterocyclylcarbonyl, carbocyclyl, carbocyclylC_{1-4}alkyl, carbocyclylC_{1-4}alkoxyC_{1-4}alkyl, carbocyclylC_{1-4}alkanoyl, carbocyclylcarbonyl, C_{1-4}alkylsulphonyl, *N,N*-di-C_{1-4}alkylaminosulphonyl or *N*-C_{1-4}alkylaminosulphonyl wherein R_1 may be optionally substituted (on an available carbon atom) by up to three substituents independently selected from: C_{1-4}alkyl optionally substituted by up to three fluoro substituents, C_{1-4}alkoxy, C_{1-4}alkanoyl, carboxy, hydroxy, halo, cyano,

amino, *N*-C_{1-4}alkylamino, *N,N*-di-C_{1-4}alkylamino, C_{1-4}alkanoylamino, mercapto, C_{1-4}alkylsulphonyl, C_{1-4}alkylsulphinyl, C_{1-4}alkylsulphanyl, nitro, heteroarylC_{1-4}alkanoylamino, or C_{1-4}alkoxycarbonyl;

R_2 is selected from hydrogen, C_{1-4}alkyl (optionally substituted by hydroxy), C_{1-4}alkoxy, cyano, nitro, halo, amino, *N*-C_{1-4}alkylamino, or *N,N*-di-C_{1-4}alkylamino;

A is selected from, -NH-, -CH_2NH-, -NHC(O)-, -CH_2NHC(O)-, -C(O)NH-, -NHC(O)NH-, -NHC(O)O-, -NHS(O_2)-, -NHC(=N-CN)-, or a direct bond; wherein each nitrogen atom is optionally substituted with C_{1-4}alkyl or hydroxyC_{2-4}alkyl;

B is selected from C_{1-10}alkylene, C_{2-10}alkenylene, C_{2-10}alkynylene, or a direct bond wherein the alkylene, alkenylene and alkynylene chains are optionally substituted by hydroxy, C_{1-4}alkoxy or amino;

R_3 is selected from hydrogen, hydroxy, C_{1-6}alkoxy, C_{1-6}alkanoyl, C_{1-6}alkanoyloxy, C_{1-6}alkanoylamino, C_{1-6}alkoxycarbonyl, aryl, aryloxy, arylcarbonyl, arylC_{1-4}alkyl, arylC_{1-4}alkoxy, arylC_{1-4}alkanoyl, aryloxycarbonyl, arylC_{1-4}alkoxycarbonyl, arylamino, diarylamino, arylsulphonyl, heteroaryl, heteroaryloxy, heteroarylC_{1-4}alkoxy, heteroarylcarbonyl, heteroarylC_{1-4}alkanoyl, heteroaryloxycarbonyl, heteroarylC_{1-4}alkoxycarbonyl, heteroarylC_{1-4}alkyl, heteroarylamino, heteroarylsulphonyl, diheteroarylamino, heterocyclyl, heterocyclyloxy, heterocyclylC_{1-4}alkoxy, heterocyclylcarbonyl, heterocyclylC_{1-4}alkanoyl, heterocyclyloxycarbonyl, heterocyclylC_{1-4}alkoxycarbonyl, heterocyclylC_{1-4}alkyl, heterocyclylamino, diheterocyclylamino, heterocyclylsulphonyl, carbocyclyl, carbocyclyloxy, carbocyclylC_{1-4}alkoxy, carbocyclylcarbonyl, carbocyclylC_{1-4}alkanoyl, carbocyclyloxycarbonyl, carbocyclylC_{1-4}alkoxycarbonyl, carbocyclylC_{1-4}alkyl, carbocyclylamino, carbocyclylsulphonyl, dicarbocyclylamino, cyano, carbamoyl, ureido, amino, *N*-C_{1-4}alkylamino, *N,N*-di-C_{1-4}alkylamino, C_{1-4}alkoxycarbonylamino, carbamoyl, *N*-C_{1-4}alkylcarbamoyl, *N,N*-di-C_{1-4}alkylcarbamoyl, C_{1-4}alkylsulphanyl, C_{1-4}alkylsulphinyl, C_{1-4}alkylsulphonyl, trifluoromethyl or fluoro wherein R_3 may be optionally substituted by up to three substituents independently selected from C_{1-4}alkyl, hydroxyC_{1-4}alkyl, C_{1-4}alkoxy, C_{1-6}alkoxycarbonyl, C_{2-6}alkenyloxycarbonyl, C_{1-4}alkanoyl, C_{1-4}alkanoylamino, C_{1-4}alkanoylthio, oxo, carboxy, hydroxy, halo, cyano, amino, *N*-C_{1-4}alkylamino, *N,N*-di-C_{1-4}alkylamino, *N*-C_{1-4}alkylaminoC_{1-4}alkyl, *N,N*-di-C_{1-4}alkylaminoC_{1-4}alkyl, carbamoyl,

N-C_{1-4}alkylcarbamoyl, *N,N*-di-C_{1-4}alkylcarbamoyl, mercapto, C_{1-4}alkylsulphonyl, C_{1-4}alkylsulphinyl, C_{1-4}alkylsulphanyl, C_{1-4}alkylsulphonyloxyC_{1-4}alkyl, nitro, trifluoromethyl, trifluoromethylC_{1-4}alkyl, C_{1-6}alkoxycarbonylamino, C_{1-6}alkoxycarbonyl(N-C_{1-4}alkyl)amino, aryl (optionally substituted by one C_{1-4}alkoxy or sulphamoyl), arylC_{1-4}alkyl, aryloxyC_{1-4}alkyl, arylcarbonyl, heteroaryl, heteroarylC_{1-4}alkyl, heteroaryloxyC_{1-4}alkyl, heteroarylcarbonyl, heterocyclyl, heterocyclylC_{1-4}alkyl, heterocyclyloxyC_{1-4}alkyl, heterocyclylcarbonyl, carbocyclyl, carbocyclylC_{1-4}alkyl, carbocyclyloxyC_{1-4}alkyl or carbocyclylcarbonyl; and

R_4 is selected from hydrogen, C_{1-4}alkyl, halo or nitro;

or a pharmaceutically acceptable salt, prodrug or solvate thereof;

with the proviso that when A is -NHC(O)- and is linked on the 2-position of the carbazole ring, R_1 is hydrogen, methyl or 3-(4-methylpiperazin-1-yl)propyl, R_2 is hydrogen or 6-bromo, B is a direct bond, $-CH_2-$, or $-C_3H_7-$ and R_3 is hydrogen or amino then R_4 cannot be hydrogen; when A is -NHC(O)- and is linked on the 3-position of the carbazole ring, R_1 is hydrogen, R_2 is hydrogen or 6-methoxy, B is a direct bond, $-CH_2-$ or $-CH(CH_3)-$, R_3 is hydrogen, halo, phenyl or phenoxy, then R_4 cannot be hydrogen or nitro; when A is -NHC(O)- and is linked on the 3-position of the carbazole ring, R_1 is ethyl, R_2 is hydrogen, B is a direct bond, R_3 is amino, 2-(2-carboxyphenyl)phenyl, 4,5,6,7-tetrahydro-1H-Benzimidazol-5-yl, or 6-methyl-4-mercapto-2-hydroxy-pyrimidin-5-yl, then R_4 cannot be hydrogen; and when A is -NHC(O)- and is linked on the 3 position of the carbazole ring, R_1 is acetyl, benzoyl, carboxymethyl or carboxyethyl, R_2 is hydrogen, B is $-CH_2-$, R_3 is hydrogen, bromo or iodo, then R_4 cannot hydrogen or nitro.

According to a further fifth feature of the invention there is provided the use of a compound of formula **(Ia)** (as depicted above), or a pharmaceutically acceptable salt, prodrug or solvate thereof, for use in medical therapy, wherein:

R_1 is selected from hydrogen, C_{1-6}alkyl, C_{1-4}alkoxyC_{1-4}alkyl, C_{1-6}alkanoyl, C_{1-4}alkanoylC_{1-4}alkyl, aryl, arylC_{1-4}alkyl, arylC_{1-4}alkoxyC_{1-4}alkyl, arylC_{1-4}alkanoyl, arylcarbonyl, heteroaryl, heteroarylC_{1-4}alkyl, heteroarylC_{1-4}alkoxyC_{1-4}alkyl, heteroarylC_{1-4}alkanoyl, heteroarylcarbonyl, heterocyclyl, heterocyclylC_{1-4}alkyl, heterocyclylC_{1-4}alkoxyC_{1-4}alkyl, heterocyclylC_{1-4}alkanoyl, heterocyclylcarbonyl, carbocyclyl, carbocyclylC_{1-4}alkyl, carbocyclylC_{1-4}alkoxyC_{1-4}alkyl, carbocyclylC_{1-4}alkanoyl, carbocyclylcarbonyl, C_{1-4}alkylsulphonyl, *N,N*-di-C_{1-4}alkylaminosulphonyl or

N-C_{1-4}alkylaminosulphonyl wherein R_1 may be optionally substituted (on an available carbon atom) by up to three substituents independently selected from: C_{1-4}alkyl optionally substituted by upto three fluoro substituents, C_{1-4}alkoxy, C_{1-4}alkanoyl, carboxy, hydroxy, halo, cyano, amino, *N*-C_{1-4}alkylamino, *N,N*-di-C_{1-4}alkylamino, C_{1-4}alkanoylamino, mercapto, C_{1-4}alkylsulphonyl, C_{1-4}alkylsulphinyl, C_{1-4}alkylsulphanyl, nitro, heteroarylC_{1-4}alkanoylamino, or C_{1-4}alkoxycarbonyl;

A is selected from, -NH-, -CH_2NH-, -NHC(O)-, -CH_2NHC(O)-, -C(O)NH-, -NHC(O)NH-, -NHC(O)O-, -NHS(O_2)-, or a direct bond; wherein each nitrogen atom is optionally substituted with C_{1-4}alkyl or hydroxyC_{2-4}alkyl;

B is C_{1-10}alkylene, C_{2-10}alkenylene, C_{2-10}alkynylene, or a direct bond wherein the alkylene, alkenylene and alkynylene chains are optionally substituted by hydroxy, C_{1-4}alkoxy or amino;

R_3 is hydrogen, hydroxy, C_{1-6}alkoxy, C_{1-6}alkanoyl, C_{1-6}alkanoyloxy, C_{1-6}alkanoylamino, C_{1-6}alkoxycarbonyl, C_{1-4}alkoxycarbonylamino; aryl, aryloxy, arylcarbonyl, arylC_{1-4}alkyl; arylC_{1-4}alkoxy, arylC_{1-4}alkanoyl, aryloxycarbonyl, arylC_{1-4}alkoxycarbonyl, arylamino, heteroaryl, heteroaryloxy, heteroarylC_{1-4}alkoxy, heteroarylcarbonyl, heteroarylC_{1-4}alkanoyl, heteroaryloxycarbonyl, heteroarylC_{1-4}alkoxycarbonyl, heterocyclyl, heterocyclyloxy, heterocyclylC_{1-4}alkoxy, heterocyclylcarbonyl, heterocyclylC_{1-4}alkanoyl, heterocyclyloxycarbonyl, heterocyclylC_{1-4}alkoxycarbonyl, carbocyclyl, carbocyclyloxy, carbocyclylC_{1-4}alkoxy, carbocyclylcarbonyl, carbocyclylC_{1-4}alkanoyl, carbocyclyloxycarbonyl, carbocyclylC_{1-4}alkoxycarbonyl, cyano, carbamoyl, ureido, amino, *N*-C_{1-4}alkylamino, *N,N*-di-C_{1-4}alkylamino, C_{1-4}alkoxycarbonylamino, aminocarbonyl, *N*-C_{1-4}alkylaminocarbonyl, *N,N*-di-C_{1-4}alkylaminocarbonyl, C_{1-4}alkylthio, trifluoromethyl or fluoro wherein R_3 may be optionally substituted by up to three substituents independently selected from C_{1-4}alkyl, hydroxyC_{1-4}alkyl, C_{1-4}alkoxy, C_{1-6}alkoxycarbonyl, C_{1-6}alkenyloxycarbonyl, C_{1-4}alkanoyl, C_{1-4}alkanoylamino, C_{1-4}alkanoylthio, oxo, carboxy, hydroxy, halo, cyano, amino, *N*-C_{1-4}alkylamino, *N,N*-di-C_{1-4}alkylamino, *N*-C_{1-4}alkylaminoC_{1-4}alkyl, *N,N*-di-C_{1-4}alkylaminoC_{1-4}alkyl, aminocarbonyl, *N*-C_{1-4}alkylaminocarbonyl, *N,N*-di-C_{1-4}alkylaminocarbonyl, mercapto, C_{1-4}alkylsulphonyl, C_{1-4}alkylsulphinyl, C_{1-4}alkylsulphanyl, nitro, trifluoromethyl, trifluoromethylC_{1-4}alkyl, aryl,

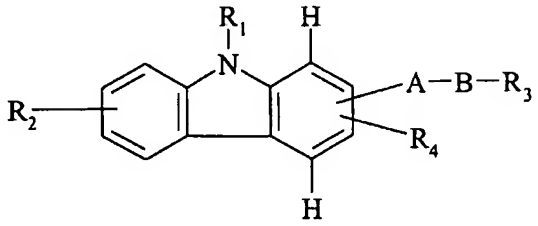
arylC$_{1-4}$alkyl, aryloxyC$_{1-4}$alkyl, C$_{1-4}$alkoxyphenyl, heteroaryl, heteroarylC$_{1-4}$alkyl, heterocyclylcarbonyl, or aminosulphonylphenyl; and

R$_4$ is hydrogen, C$_{1-4}$alkyl, halo or nitro;

or a pharmaceutically acceptable salt, prodrug or solvate thereof;

with the proviso that when A is -NHC(O)- and is linked on the 2-position of the carbazole ring, R$_1$ is hydrogen, methyl or 3-(4-methylpiperazin-1-yl)propyl, R$_2$ is hydrogen or 6-bromo, B is a direct bond, -CH$_2$-, or -C$_3$H$_7$- and R$_3$ is hydrogen or amino then R$_4$ cannot be hydrogen; when A is -NHC(O)- and is linked on the 3-position of the carbazole ring, R$_1$ is hydrogen, R$_2$ is hydrogen or 6-methoxy, B is a direct bond, -CH$_2$- or -CHCH$_3$)-, R$_3$ is hydrogen, halo, phenyl or phenoxy, then R$_4$ cannot be hydrogen or nitro; when A is -NHC(O)- and is linked on the 3-position of the carbazole ring, R$_1$ is ethyl, R$_2$ is hydrogen, B is a direct bond, R$_3$ is amino, 2-(2-carboxyphenyl)phenyl, 4,5,6,7-tetrahydro-1H-Benzimidazol-5-yl, or 6-methyl-4-mercapto-2-hydroxy-pyrimidin-5-yl, then R$_4$ cannot be hydrogen; and when A is -NHC(O)- and is linked on the 3 position of the carbazole ring, R$_1$ is acetyl, benzoyl, carboxymethyl or carboxyethyl, R$_2$ is hydrogen, B is -CH$_2$-, R$_3$ is hydrogen, bromo or iodo, then R$_4$ cannot hydrogen or nitro.

According an alternative fifth feature of the invention there is provided the use of a compound of formula **(Ia')**, or a pharmaceutically acceptable salt, prodrug or solvate thereof, for use in medical therapy:



(Ia')

wherein:

R$_1$ is selected from hydrogen, C$_{1-6}$alkyl, C$_{1-4}$alkoxyC$_{1-4}$alkyl, C$_{1-6}$alkanoyl, C$_{1-4}$alkanoylC$_{1-4}$alkyl, aryl, arylC$_{1-4}$alkyl, arylC$_{1-4}$alkoxyC$_{1-4}$alkyl, arylC$_{1-4}$alkanoyl, arylcarbonyl, heteroaryl, heteroarylC$_{1-4}$alkyl, heteroarylC$_{1-4}$alkoxyC$_{1-4}$alkyl, heteroarylC$_{1-4}$alkanoyl, heteroarylcarbonyl, heterocyclyl, heterocyclylC$_{1-4}$alkyl, heterocyclylC$_{1-4}$alkoxyC$_{1-4}$alkyl, heterocyclylC$_{1-4}$alkanoyl, heterocyclylcarbonyl, carbocyclyl, carbocyclylC$_{1-4}$alkyl, carbocyclylC$_{1-4}$alkoxyC$_{1-4}$alkyl, carbocyclylC$_{1-4}$alkanoyl,

carbocyclylcarbonyl, cyanoC_{1-4}alkyl, aminoC_{1-4}alkyl, *N*-C_{1-4}alkylaminoC_{1-4}alkyl, or *N,N*-di-C_{1-4}alkylaminoC_{1-4}alkyl; wherein R_1 may be optionally substituted (on an available carbon atom) by up to three substituents independently selected from: C_{1-4}alkyl, C_{1-4}alkoxy, C_{1-4}alkanoyl, carboxy, hydroxy, halo, cyano, amino, *N*-C_{1-4}alkylamino, *N,N*-di-C_{1-4}alkylamino, C_{1-4}alkanoylamino, mercapto, C_{1-4}alkylsulphonyl, C_{1-4}alkylsulphinyl, C_{1-4}alkylsulphanyl, nitro, trifluoromethyl-C_{1-4}alkyl, heteroarylC_{1-4}alkanoylamino, or C_{1-4}alkoxycarbonyl;

R_2 is selected from hydrogen, C_{1-4}alkyl, C_{1-4}alkoxy, cyano, nitro, halo, amino, *N*-C_{1-4}alkylamino, or *N,N*-di-C_{1-4}alkylamino;

A is selected from -NHC(O)-, -NHC(O)NH-, or -NHC(O)O- wherein each nitrogen atom is optionally substituted with C_{1-4}alkyl;

B is C_{1-6}alkylene, C_{2-6}alkenylene, C_{2-6}alkynylene, or a direct bond;

R_3 is hydrogen, C_{1-6}alkoxy, C_{1-6}alkanoyl, C_{1-6}alkoxycarbonyl, aryl, aryloxy, arylC_{1-4}alkoxy, arylcarbonyl, aryl$_{1-4}$alkanoyl, aryloxycarbonyl, arylC_{1-4}alkoxycarbonyl, heteroaryl, heteroaryloxy, heteroarylC_{1-4}alkoxy, heteroarylcarbonyl, heteroarylC_{1-4}alkanoyl, heteroaryloxycarbonyl, heteroaryl-C_{1-4}alkoxycarbonyl, heterocyclyl, heterocyclyloxy, heterocyclylC_{1-4}alkoxy, heterocyclylcarbonyl, heterocyclylC_{1-4}alkanoyl, heterocyclyloxycarbonyl, heterocyclylC_{1-4}alkoxycarbonyl, carbocyclyl, carbocyclyloxy, carbocyclylC_{1-4}alkoxy, carbocyclylcarbonyl, carbocyclylC_{1-4}alkanoyl, carbocyclyloxycarbonyl, carbocyclylC_{1-4}alkoxycarbonyl, amino, *N*-C_{1-4}alkylamino, *N,N*-di-C_{1-4}alkylamino, C_{1-4}alkyl)thio, or fluoro wherein R_3 may be optionally substituted (on an available carbon atom) by up to three substituents independently selected from C_{1-4}alkyl, C_{1-4}alkoxy, C_{1-4}alkanoyl, carboxy, hydroxy, halo, cyano, amino, *N*-C_{1-4}alkylamino, *N,N*-di-C_{1-4}alkylamino, C_{1-4}alkanoylamino, mercapto, C_{1-4}alkylsulphonyl, C_{1-4}alkylsulphinyl, C_{1-4}alkylsulphanyl, nitro, trifluoromethylC_{1-4}alkyl, phenyl, C_{1-4}alkoxyphenyl, heteroaryl, heteroarylC_{1-4}alkyl, aminosulphonylphenyl or C_{1-4}alkoxycarbonyl; and

R_4 is hydrogen, C_{1-4}alkyl, or nitro;

with the proviso that when A is -NHC(O)- and is linked on the 2-position of the carbazole ring, R_1 is hydrogen, methyl or 3-(4-methylpiperazin-1-yl)propyl, R_2 is hydrogen or 6-bromo, B is a direct bond, -CH_2-, or -C_3H_7- and R_3 is hydrogen or amino then R_4 cannot be hydrogen; when A is -NHC(O)- and is linked on the 3-position of the carbazole ring, R_1 is hydrogen, R_2 is hydrogen or 6-methoxy, B is a direct bond, -CH_2- or -$CHCH_3$)-, R_3 is hydrogen, halo,

phenyl or phenoxy, then R_4 cannot be hydrogen or nitro; when A is -NHC(O)- and is linked on the 3-position of the carbazole ring, R_1 is ethyl, R_2 is hydrogen, B is a direct bond, R_3 is amino, 2-(2-carboxyphenyl)phenyl, 4,5,6,7-tetrahydro-1H-Benzimidazol-5-yl, or 6-methyl-4-mercapto-2-hydroxy-pyrimidin-5-yl, then R_4 cannot be hydrogen; and when A is -NHC(O)- and is linked on the 3 position of the carbazole ring, R_1 is acetyl, benzoyl, carboxymethyl or carboxyethyl, R_2 is hydrogen, B is $-CH_2-$, R_3 is hydrogen, bromo or iodo, then R_4 cannot hydrogen or nitro.

A preferred group of values for the substituents described within each feature of the invention described herein, are:

R_1 is C_{1-4}alkyl, C_{1-4}alkanoyl, arylC_{1-4}alkanoyl, heteroarylC_{1-4}alkanoyl, C_{1-4}alkylsulphonyl, *N*-C_{1-4}alkylaminosulphonyl, or *N,N*-C_{1-4}alkylaminosulphonyl, optionally substituted as above;

R_2 is hydrogen, hydroxyC_{1-4}alkyl or halo;

A is -NH-C(O)-O-;

B is C_{1-6}alkylene or C_{2-6}alkenylene, optionally substituted as above;

R_3 is hydrogen, C_{1-6}alkoxy, aryl, aryloxy, heteroaryl, heteroaryloxy, heterocyclyl, or heterocyclyloxy, optionally substituted as above; and

R_4 is hydrogen.

A further preferred group of values for the substituents described in the first feature of the invention described herein, are:

R_1 is C_{1-4}alkyl, C_{1-4}alkanoyl , arylC_{1-4}alkanoyl, heteroarylC_{1-4}alkanoyl, C_{1-4}alkylsulphonyl, *N*-C_{1-4}alkylaminosulphonyl, or *N,N*-C_{1-4}alkylaminosulphonyl, optionally substituted as above;

R_2 is hydrogen, hydroxyC_{1-4}alkyl or halo;

A is -NH-C(O)-NH-, or -NH-C(O)-N(C_{1-4}alkyl)-;

B is C_{1-6}alkylene or C_{2-6}alkenylene, optionally substituted as above;

R_3 is hydrogen, C_{1-6}alkoxy, aryl, aryloxy, heteroaryl, heteroaryloxy, heterocyclyl, or heterocyclyloxy, optionally substituted as above; and

R_4 is hydrogen.

A further preferred group of values for the substituents described in the first feature of the invention described herein, are:

$\mathbf{R_1}$ is C_{1-4}alkyl, C_{1-4}alkanoyl , arylC_{1-4}alkanoyl, heteroarylC_{1-4}alkanoyl, C_{1-4}alkylsulphonyl, *N*-C_{1-4}alkylaminosulphonyl, or *N,N*-C_{1-4}alkylaminosulphonyl, optionally substituted as above;

$\mathbf{R_2}$ is hydrogen, hydroxyC_{1-4}alkyl or halo;

A is -NH-C(O)-;

B is C_{1-6}alkylene or C_{2-6}alkenylene, optionally substituted as above;

$\mathbf{R_3}$ is hydrogen, C_{1-6}alkoxy, aryl, aryloxy, heteroaryl, heteroaryloxy, heterocyclyl, or heterocyclyloxy, optionally substituted as above; and

$\mathbf{R_4}$ is hydrogen.

A more preferred group of values for the substituents described the first feature of the invention described herein, are:

$\mathbf{R_1}$ is C_{1-4}alkylsulphonyl, *N*-C_{1-4}alkylaminosulphonyl, or *N,N*-C_{1-4}alkylaminosulphonyl;

$\mathbf{R_2}$ is hydrogen, hydroxyC_{1-4}alkyl or halo;

A is -NH-C(O)-, -NH-C(O)-O-, -NH-C(O)-NH-, or -NH-C(O)-N(C_{1-4}alkyl)-;

B is C_{1-6}alkylene or C_{2-6}alkenylene, optionally substituted as above;

$\mathbf{R_3}$ is hydrogen, alkoxy, aryl, aryloxy, heteroaryl, heteroaryloxy, heterocyclyl, or heterocyclyloxy; optionally substituted as above; and

$\mathbf{R_4}$ is hydrogen.

A further preferred group of values for the substituents described in the first feature of the invention described herein, are:

$\mathbf{R_1}$ is C_{1-4}alkyl, C_{1-4}alkanoyl , arylC_{1-4}alkanoyl, or heteroarylC_{1-4}alkanoyl, C_{1-4}alkylsulphonyl, *N*-C_{1-4}alkylaminosulphonyl, or *N,N*-C_{1-4}alkylaminosulphonyl optionally substituted as above;

$\mathbf{R_2}$ is hydrogen, hydroxyC_{1-4}alkyl or halo;

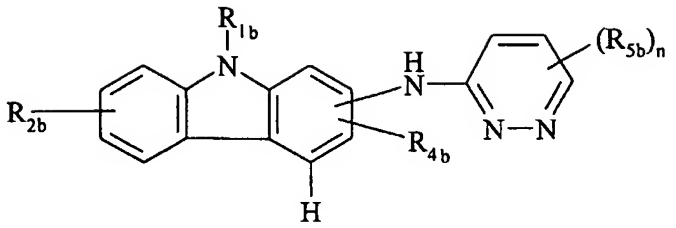
A is -NH-C(O)-, -NH-C(O)-O-, -NH-C(O)-NH-, or -NH-C(O)-N(C_{1-4}alkyl)-;

B is C_{1-6}alkylene or C_{2-6}alkenylene, optionally substituted as above;

$\mathbf{R_3}$ is morpholino, pyridin-4-yl, pyrrolidinon-1-yl, *N*-methylpiperidin-4-yl, .triazol-1-yl or imidazol-1-yl. optionally substituted as above; and

$\mathbf{R_4}$ is hydrogen.

According to the sixth feature of the invention there is a compound of formula **(Ib)**:



(Ib)

wherein:

$\mathbf{R_{1b}}$ is selected from hydrogen, C_{1-6}alkyl, C_{1-4}alkoxyC_{1-4}alkyl, C_{1-6}alkanoyl, C_{1-4}alkanoylC_{1-4}alkyl, aryl, arylC_{1-4}alkyl, arylC_{1-4}alkoxyC_{1-4}alkyl, arylC_{1-4}alkanoyl, arylcarbonyl, heteroaryl, heteroarylC_{1-4}alkyl, heteroarylC_{1-4}alkoxyC_{1-4}alkyl, heteroarylC_{1-4}alkanoyl, heteroarylcarbonyl, heterocyclyl, heterocyclylC_{1-4}alkyl, heterocyclylC_{1-4}alkoxyC_{1-4}alkyl, heterocyclylC_{1-4}alkanoyl, heterocyclylcarbonyl, carbocyclyl, carbocyclylC_{1-4}alkyl, carbocyclylC_{1-4}alkoxyC_{1-4}alkyl, carbocyclylC_{1-4}alkanoyl, carbocyclylcarbonyl, C_{1-4}alkylsulphonyl, *N,N*-di-C_{1-4}alkylaminosulphonyl or *N*-C_{1-4}alkylaminosulphonyl wherein R_{1b} may be optionally substituted (on an available carbon atom) by up to three substituents independently selected from C_{1-4}alkyl optionally substituted by up to three fluoro substituents, C_{1-4}alkoxy, C_{1-4}alkanoyl, carboxy, hydroxy, halo, cyano, amino, *N*-C_{1-4}alkylamino, *N,N*-di-C_{1-4}alkylamino, C_{1-4}alkanoylamino, mercapto, C_{1-4}alkylsulphonyl, C_{1-4}alkylsulphinyl, C_{1-4}alkylsulphanyl, nitro, heteroarylC_{1-4}alkanoylamino, or C_{1-4}alkoxycarbonyl;

$\mathbf{R_{2b}}$ is selected from hydrogen, C_{1-4}alkyl (optionally substituted by hydroxy), C_{1-4}alkoxy, cyano, nitro, halo, amino, *N*-C_{1-4}alkylamino, or *N,N*-di-C_{1-4}alkylamino;

$\mathbf{R_{4b}}$ is selected from hydrogen, C_{1-4}alkyl, halo or nitro;

$\mathbf{R_{5b}}$ is selected from C_{1-4}alkyl, hydroxyC_{1-4}alkyl, C_{1-4}alkoxy, C_{1-6}alkoxycarbonyl, C_{2-6}alkenyloxycarbonyl, C_{1-4}alkanoyl, C_{1-4}alkanoylamino, C_{1-4}alkanoylthio, oxo, carboxy, hydroxy, halo, cyano, amino, *N*-C_{1-4}alkylamino, *N,N*-di-C_{1-4}alkylamino, *N*-C_{1-4}alkylaminoC_{1-4}alkyl, *N,N*-di-C_{1-4}alkylaminoC_{1-4}alkyl, carbamoyl, *N*-C_{1-4}alkylcarbamoyl, *N,N*-di-C_{1-4}alkylcarbamoyl, mercapto, C_{1-4}alkylsulphonyl, C_{1-4}alkylsulphinyl, C_{1-4}alkylsulphanyl, C_{1-4}alkylsulphonyloxyC_{1-4}alkyl, nitro, trifluoromethyl, trifluoromethylC_{1-4}alkyl, C_{1-6}alkoxycarbonylamino, C_{1-6}alkoxycarbonyl(*N*-C_{1-4}alkyl)amino, aryl (optionally substituted by one C_{1-4}alkoxy or sulphamoyl), arylC_{1-4}alkyl, aryloxyC_{1-4}alkyl, arylcarbonyl, heteroaryl, heteroarylC_{1-4}alkyl, heteroaryloxyC_{1-4}alkyl, heteroarylcarbonyl,

heterocyclyl, heterocyclylC_{1-4}alkyl, heterocyclyloxyC_{1-4}alkyl, heterocyclylcarbonyl, carbocyclyl, carbocyclylC_{1-4}alkyl, carbocyclyloxyC_{1-4}alkyl or carbocyclylcarbonyl; and

n is 0-3; wherein the values of R_{5b} may be the same or different;

or a pharmaceutically acceptable salt, prodrug or solvate thereof.

Preferably R_{1b} is selected from C_{1-6}alkyl optionally substituted by up to three halo substituents.

More preferably R_{1b} is selected from C_{1-3}alkyl optionally substituted by up to three halo substituents.

Particularly R_{1b} is selected from ethyl, isopropyl and 2,2,2-trifluoroethyl.

More particularly R_{1b} is isopropyl.

Preferably R_{2b} is hydrogen.

Preferably R_{4b} is hydrogen.

Preferably R_{5b} is selected from C_{1-4}alkyl, halo, cyano, carbamoyl, trifluoromethyl or heteroaryl.

More preferably R_{5b} is selected from methyl, halo, cyano, carbamoyl, trifluoromethyl or pyridyl.

Particularly R_{5b} is selected from methyl, halo, cyano, carbamoyl, trifluoromethyl or pyrid-4-yl.

More particularly R_{5b} is carbamoyl.

Preferably n is 1.

Preferred compounds of formula **(Ib)** are:

9-ethyl-3-(6-methylpyridazin-3-ylamino)carbazole;

9-isopropyl-3-(6-methylpyridazin-3-ylamino)carbazole;

9-ethyl-3-(6-carbamoylpyridazin-3-ylamino)carbazole;

9-(2,2,2-trifluoroethyl)-3-(6-methylpyridazin-3-ylamino)carbazole;

9-(2,2,2-trifluoroethyl)-3-(6-carbamoylpyridazin-3-ylamino)carbazole;

9-isopropyl-3-(6-carbamoylpyridazin-3-ylamino)carbazole;

9-ethyl-3-(6-trifluoromethylpyridazin-3-ylamino)carbazole;

9-ethyl-3-[6-(pyrid-4-yl)pyridazin-3-ylamino]carbazole; and

9-ethyl-3-(6-cyanopyridazin-3-ylamino)carbazole;

or a pharmaceutically acceptable salt, prodrug or solvate thereof.

According to a further aspect of the invention there is provided the use of a compound of formula **(Ib)**, or a pharmaceutically acceptable salt, prodrug or solvate thereof, as a medicament.

According to a further aspect of the invention there is provided a pharmaceutical composition comprising a compound of formula **(Ib)**, or a pharmaceutically acceptable salt, prodrug or solvate thereof, in admixture with a pharmaceutically-acceptable diluent or carrier.

According to a further aspect of the invention there is provided a pharmaceutical composition comprising a compound of formula **(Ib)**, or a pharmaceutically acceptable salt, prodrug or solvate thereof, in admixture with a pharmaceutically-acceptable diluent or carrier for the treatment of a warm-blooded animal, in need of treatment of disorders mediated by the neuropeptide Y5 receptor.

According to a further aspect of the invention there is provided a pharmaceutical composition comprising a compound of formula **(Ib)**, or a pharmaceutically acceptable salt, prodrug or solvate thereof, in admixture with a pharmaceutically-acceptable diluent or carrier for the treatment of eating disorders in a warm-blooded animal, in need of treatment.

According a further aspect of the invention there is provided the use of a compound of formula **(Ib)** in the manufacture of a medicament for the treatment, in a warm-blooded animal, of disorders mediated by the neuropeptide Y5 receptor or a pharmaceutically acceptable salt, prodrug or solvate thereof.

According to a further aspect of the invention there is provided the use of a compound of formula **(Ib)** or a pharmaceutically acceptable salt, prodrug or solvate thereof in the manufacture of a medicament for the treatment of eating disorders in a warm-blooded animal.

According to a further aspect of the invention there is provided a method of treatment, in a warm-blooded animal, of disorders mediated by the neuropeptide Y5 receptor comprising administering a therapeutically effective amount of a compound of formula **(Ib)** or a pharmaceutically acceptable salt, prodrug or solvate thereof.

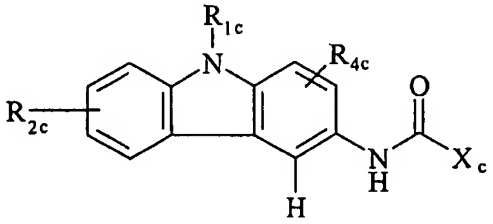
According to a further aspect of the invention there is provided a method of treatment, in a warm-blooded animal, of eating disorders, comprising administering a therapeutically effective amount of a compound of formula **(Ib)** or a pharmaceutically acceptable salt, prodrug or solvate thereof.

According to another feature of the invention there is provided the use of a compound of formula **(Ib)**, or a pharmaceutically acceptable salt, prodrug or solvate thereof, in the manufacture of a medicament for promoting weight loss.

According to a further aspect of the first feature of the invention there is provided a method of promoting weight loss, comprising administering a therapeutically effective amount of a compound of formula **(Ib)**, or a pharmaceutically acceptable salt, prodrug or solvate thereof.

According to a further aspect of the invention there is provided a pharmaceutical composition comprising a compound of formula **(Ib)**, or a pharmaceutically acceptable salt, prodrug or solvate thereof, in admixture with a pharmaceutically acceptable diluent or carrier for use in promoting weight loss.

According to the seventh feature of the invention there is provided a compound of the formula **(Ic)**:



(Ic)

wherein:

$\mathbf{R_{1c}}$ is selected from C_{1-6}alkyl, C_{1-4}alkoxyC_{1-4}alkyl, C_{1-4}alkanoylC_{1-4}alkyl, aryl, arylC_{1-4}alkyl, arylC_{1-4}alkoxyC_{1-4}alkyl, heteroaryl, heteroarylC_{1-4}alkyl, heteroarylC_{1-4}alkoxyC_{1-4}alkyl, heterocyclyl, heterocyclylC_{1-4}alkyl, heterocyclylC_{1-4}alkoxyC_{1-4}alkyl, carbocyclyl, carbocyclylC_{1-4}alkyl, carbocyclylC_{1-4}alkoxyC_{1-4}alkyl, C_{1-4}alkylsulphonyl, *N,N*-di-C_{1-4}alkylaminosulphonyl or *N*-C_{1-4}alkylaminosulphonyl wherein R_{1c} may be optionally substituted (on an available carbon atom) by up to three substituents independently selected from: C_{1-4}alkyl optionally substituted by up to three fluoro substituents, C_{1-4}alkoxy, C_{1-4}alkanoyl, carboxy, hydroxy, halo, cyano, amino, *N*-C_{1-4}alkylamino, *N,N*-di-C_{1-4}alkylamino, C_{1-4}alkanoylamino, mercapto, C_{1-4}alkylsulphonyl, C_{1-4}alkylsulphinyl, C_{1-4}alkylsulphanyl, nitro, heteroarylC_{1-4}alkanoylamino, or C_{1-4}alkoxycarbonyl;

$\mathbf{R_{2c}}$ is selected from hydrogen, C_{1-4}alkyl (optionally substituted by hydroxy), C_{1-4}alkoxy, cyano, nitro, halo, amino, *N*-C_{1-4}alkylamino, or *N,N*-di-C_{1-4}alkylamino;

$\mathbf{X_c}$ is a nitrogen linked heteroring optionally substituted by up to three substituents independently selected from Group A_c; or X_c is -N(L_c)-B_c-R_{3c};

$\mathbf{L_c}$ is selected from hydrogen, C_{1-4}alkyl or hydroxyC_{2-4}alkyl;

$\mathbf{B_c}$ is selected from C_{1-10}alkylene, C_{2-10}alkenylene, C_{2-10}alkynylene, or a direct bond wherein the alkylene, alkenylene and alkynylene chains are optionally substituted by hydroxy, C_{1-4}alkoxy or amino;

$\mathbf{R_{3c}}$ is selected from hydrogen, hydroxy, C_{1-6}alkoxy, C_{1-6}alkanoyl, C_{1-6}alkanoyloxy, C_{1-6}alkanoylamino, C_{1-6}alkoxycarbonyl, C_{1-4}alkoxycarbonylamino; aryl, aryloxy, arylcarbonyl, arylC_{1-4}alkyl, arylC_{1-4}alkoxy, arylC_{1-4}alkanoyl, aryloxycarbonyl, arylC_{1-4}alkoxycarbonyl, arylamino, diarylamino, arylsulphonyl, heteroaryl, heteroaryloxy, heteroarylC_{1-4}alkoxy, heteroarylcarbonyl, heteroarylC_{1-4}alkanoyl, heteroaryloxycarbonyl, heteroarylC_{1-4}alkoxycarbonyl, heteroarylC_{1-4}alkyl, heteroarylamino, diheteroarylamino, heteroarylsulphonyl, heterocyclyl, heterocyclyloxy, heterocyclylC_{1-4}alkoxy, heterocyclylcarbonyl, heterocyclylC_{1-4}alkanoyl, heterocyclyloxycarbonyl, heterocyclylC_{1-4}alkoxycarbonyl, heterocyclylC_{1-4}alkyl, heterocyclylamino, diheterocyclylamino, heterocyclylsulphonyl, carbocyclyl, carbocyclyloxy, carbocyclylC_{1-4}alkoxy, carbocyclylcarbonyl, carbocyclylC_{1-4}alkanoyl, carbocyclyloxycarbonyl, carbocyclylC_{1-4}alkoxycarbonyl, carbocyclylC_{1-4}alkyl, carbocyclylamino, carbocyclylamino, carbocyclylsulphonyl, cyano, carbamoyl, ureido, amino, *N*-C_{1-4}alkylamino, *N,N*-di-C_{1-4}alkylamino, carbamoyl, *N*-C_{1-4}alkylcarbamoyl, *N,N*-di-C_{1-4}alkylcarbamoyl, C_{1-4}alkylsulphanyl, C_{1-4}alkylsulphinyl, C_{1-4}alkylsulphonyl, trifluoromethyl or fluoro wherein R_{3c} may be optionally substituted by up to three substituents independently selected from Group A_c;

$\mathbf{R_{4c}}$ is selected from hydrogen, C_{1-4}alkyl, halo or nitro; and

Group A_c is C_{1-4}alkyl, hydroxyC_{1-4}alkyl, C_{1-4}alkoxy, C_{1-6}alkoxycarbonyl, C_{2-6}alkenyloxycarbonyl, C_{1-4}alkanoyl, C_{1-4}alkanoylamino, C_{1-4}alkanoylthio, oxo, carboxy, hydroxy, halo, cyano, amino, *N*-C_{1-4}alkylamino, *N,N*-di-C_{1-4}alkylamino, *N*-C_{1-4}alkylaminoC_{1-4}alkyl, *N,N*-di-C_{1-4}alkylaminoC_{1-4}alkyl, carbamoyl, *N*-C_{1-4}alkylcarbamoyl, *N,N*-di-C_{1-4}alkylcarbamoyl, mercapto, C_{1-4}alkylsulphonyl, C_{1-4}alkylsulphinyl,

C_{1-4}alkylsulphanyl, C_{1-4}alkylsulphonyloxyC_{1-4}alkyl, nitro, trifluoromethyl, trifluoromethylC_{1-4}alkyl, C_{1-4}alkoxycarbonylamino, C_{1-4}alkoxycarbonyl(*N*-C_{1-4}alkyl)amino, aryl (optionally substituted by one C_{1-4}alkoxy or sulphamoyl), arylC_{1-4}alkyl, aryloxyC_{1-4}alkyl, arylcarbonyl, heteroaryl, heteroarylC_{1-4}alkyl, heteroaryloxyC_{1-4}alkyl, heteroarylcarbonyl, heterocyclyl, heterocyclylC_{1-4}alkyl, heterocyclyloxyC_{1-4}alkyl, heterocyclylcarbonyl, carbocyclyl, carbocyclylC_{1-4}alkyl, carbocyclyloxyC_{1-4}alkyl or carbocyclylcarbonyl;

or a pharmaceutically acceptable salt, prodrug or solvate thereof;

with the proviso that when R_{1c} is ethyl, $R_{2c}$and R_{4c} are hydrogen and X_c is -N(L_c)-B_c-R_{3c}, -N(L_c)-B_c-R_{3c} is not 5-*t*-butyloxazol-3-ylamino, 3-methoxynaphtl-2-ylamino, 2-methoxy-5-*t*-butylaniline, 3-(diethylamino)propylamino, naphthylamino, hydrazino, 9-ethylcarbazol-3-ylamino, amino or benzoylamino.

Preferably R_{1c} is selected from C_{1-6}alkyl, C_{1-4}alkylsulphonyl, *N,N*-di-C_{1-4}alkylaminosulphonyl wherein R_{1c} may be optionally (on an available carbon) substituted by up to three halo substituents.

More preferably R_{1c} is selected from C_{1-3}alkyl, C_{1-2}alkylsulphonyl, *N,N*-di-C_{1-2}alkylaminosulphonyl wherein R_{1c} may be optionally substituted (on an available carbon) by up to three halo substituents.

Particularly R_{1c} is selected from ethyl, isopropyl, 2,2,2-trifluoroethyl, mesyl and *N,N*-dimethylaminosulphonyl.

More particularly R_{1c} is selected from ethyl, isopropyl and mesyl.

Preferably R_{2c} is selected from hydrogen, cyano or halo.

More preferably R_{2c} is selected from hydrogen, cyano, fluoro or bromo.

Particularly R_{2c} is hydrogen or fluoro.

More particularly R_{2c} is hydrogen.

In one aspect of the invention preferably X_c is a nitrogen linked heteroring optionally substituted by up to three substituents independently selected from Group A_c.

In another aspect of the invention, preferably X_c is -N(L_c)-B_c-R_{3c}.

When X_c is a nitrogen linked heteroring optionally substituted by up to three substituents independently selected from Group A_c preferably X_c is piperidin-1-yl, morpholino, piperazin-1-yl, pyrrolidin-1-yl, optionally substituted by up to three substituents independently selected from C_{1-4}alkyl, hydroxyC_{1-4}alkyl, C_{1-6}alkoxycarbonyl, carboxy,

N-C_{1-4}alkylamino, *N,N*-di-C_{1-4}alkylaminoC_{1-4}alkyl, carbamoyl, *N*-C_{1-4}alkylcarbamoyl, *N,N*-di-C_{1-4}alkylcarbamoyl, C_{1-4}alkylsulphonyloxyC_{1-4}alkyl, C_{1-4}alkoxycarbonyl(*N*-C_{1-4}alkyl)amino, aryl, arylC_{1-4}alkyl, aryloxyC_{1-4}alkyl, heterocyclyl, heterocyclylC_{1-4}alkyl, or heterocyclylcarbonyl.

When X_c is a nitrogen linked heteroring optionally substituted by up to three substituents independently selected from Group A_c more preferably X_c is piperidin-1-yl, morpholino, piperazin-1-yl, pyrrolidin-1-yl, optionally substituted by one or two substituents independently selected from methyl, hydroxymethyl, ethoxycarbonyl, carboxy, methylamino, *N,N*-dimethylaminomethyl, carbamoyl, *N*-methylcarbamoyl, *n*-butylcarbamoyl, *N,N*-dimethylcarbamoyl, mesyloxymethyl, *t*-butoxycarbonyl(*N*-methyl)amino, phenyl, benzyl, phenoxymethyl, phenoxyethyl, pyrrolidin-1-yl, piperidin-1-yl, pyrrolidin-1-ylmethyl or morpholinocarbonyl.

When X_c is a nitrogen linked heteroring optionally substituted by up to three substituents independently selected from Group A_c particularly X_c is piperidin-1-yl, morpholino, 4-methylpiperazin-1-yl, 3-methyl-2-phenylmorpholino, 4-benzylpiperazin-1-yl, 2-pyrrolidin-1-ylmethylpyrrolidin-1-yl, pyrrolidin-1-ylpiperidin-1-yl, 4-ethoxycarbonylpiperidin-1-yl, 4-hydroxymethylpiperidin-1-yl, 4-carboxypiperidin-1-yl, 4-mesyloxymethylpiperidin-1-yl, 4-*N,N*-dimethylaminomethylpiperidin-1-yl, 4-phenoxymethylpiperidin-1-yl, 4-*N*-methylcarbamoylpiperidin-1-yl, 4-*N,N*-dimethylcarbamoylpiperidin-1-yl, 4-*n*-butylcarbamoylpiperidin-1-yl, 4-morpholinocarbonylpiperidin-1-yl, 3-phenoxyethylpyrrolidin-1-yl, 3-carbamoylpiperidin-1-yl, 4-piperidin-1-ylpiperidin-1-yl, 3-*t*-butoxycarbonyl(*N*-methyl)aminopyrrolidin-1-yl, 3-*N*-methylaminopyrrolidin-1-yl and 2,6-dimethylmorpholino.

When X_c is -N(L_c)-B_c-R_{3c}, preferably X_c is propylamino, *N,N*-diethylamino, *N,N*-dimethylamino, pyrid-4-ylmethylamino, *N*-pyrid-4-ylmethyl-*N*-ethylamino, 4-methoxyanilino, benzylamino, *N*-methyl-*N*-benzylamino, *N*-ethylanilino, *N*-(3-hydroxypropyl)-*N*-pyrid-4-ylmethylamino, *N*-methyl-*N*-phenethylamino, *N*-methyl-*N*-pyrid-4-ylethylamino, *N*-(2-*N,N*-dimethylaminoethyl)-*N*-methylamino, *N*-(3-*N,N*-dimethylaminopropyl)-*N*-methylamino, anilino, 4-fluoroanilino, phenoxyethylamino, *N*-methylanilino, *N*-methyl-*N*-pyrid-2-ylethylamino,

morpholinoethylamino, *N*-ethyl-*N*-phenoxyethylamino, *N*-methyl-*N*-morpholinopropylamino, *N*-methyl-*N*-morpholinoethylamino, acetamidoethylamino, methylthioethylamino, imidazol-1-ylpropylamino, 4-hydroxycyclohexylamino, 3,5,5-trimethylcyclohexylamino, 1-ethylpyrrolidin-2-ylmethylamino, fur-2-ylmethylamino, tetrahydrofur-2-ylmethylamino, morpholinopropylamino, pyrid-2-ylmethylamino, pyrid-2-ylethylamino, *N*-methyl-*N*-pyrid-2-ylmethylamino, 1-benzylpiperidin-4-ylamino, 1-phenyleth-1-ylamino, 2-propynylamino, allylamino, 3-*N,N*-diethylaminopropylamino, 1,1-di-*i*-butylmethylamino, *N*-methyl-*N*-(2-*N,N*-diethylaminoethyl)amino, 2-phenoxy-1-methylethylaminoindan-2-ylamino, 4-(1,2,3-thiaziazol-4-yl)benzylamino, *N*-methyl-*N*-(1-methylpiperidin-4-yl)amino, 2-fluoro-4-trifluoromethylbenzylamino, 1-methylpyrrolidin-2-ylethylamino, 5-methylfur-2-ylmethylamino, *N*-(4-*N,N*-dimethylaminophenethyl)-*N*-methylamino, *N*-methyl-*N*-pyrid-4-ylethylamino, 2-anilino-1,1-dimethylethylamino, 2-anilinoethylamino, benzthiazol-2-ylamino, 2-oxohomopiperidin-3-ylamino, 4-bromobenzoylmethylamino, benzimidazol-2-ylmethylamino, oxazol-3-ylamino, 2-fluoro-4-chlorobenzylamino, *N*-(3-*N*-methylaminopropyl)-*N*-methylamino and 9-ethylcarbazol-3-ylamino.

Preferably X_c is *N*-(2-*N,N*-dimethylaminoethyl)-*N*-methylamino, *N*-(3-*N,N*-dimethylaminopropyl)-*N*-methylamino, *N*-methyl-*N*-pyrid-2-ylethylamino, acetamidoethylamino, 1-phenyleth-1-ylamino, 1-methylpyrrolidin-2-ylethylamino, *N*-methyl-*N*-pyrid-4-ylethylamino, 4-*N,N*-dimethylaminomethylpiperidin-1-yl, 4-morpholinocarbonylpiperidin-1-yl or morpholino.

Preferably R_{4c} is hydrogen.

Preferred compounds of formula **(Ic)** are:

9-ethyl-3-[*N'*-methyl-*N'*-(2-*N,N*-dimethylaminoethyl)ureido]carbazole;

9-ethyl-3-[*N'*-methyl-*N'*-(3-*N,N*-dimethylaminopropyl)ureido]carbazole;

9-ethyl-3-[*N'*-methyl-*N'*-(2-pyrid-2-ylethyl)ureido]carbazole;

9-ethyl-3-[*N'*-(2-acetamidoethyl)ureido]carbazole;

9-ethyl-3-[*N'*-(1-methyl-1-phenylmethyll)ureido]carbazole;

9-ethyl-3-{*N'*-[2-(1-methylpyrrolidin-2-yl)ethyl]ureido}carbazole;

9-mesyl-3-[*N'*-methyl-*N'*-(2-pyrid-4-ylethyl)ureido]carbazole;

9-ethyl-3-[4-(*N,N*-dimethylaminomethyl)piperidin-1-ylcarbonylamino]carbazole;

9-ethyl-3-[4-(morpholinocarbonyl)piperidin-1-ylcarbonylamino]carbazole;

9-isopropyl-3-(morpholinocarbonylamino)carbazole;

6-fluoro-9-isopropyl-3-(morpholinocarbonylamino)carbazole;

or a pharmaceutically acceptable salt, prodrug or solvate thereof.

According to a further aspect of the invention there is provided the use of a compound of formula **(Ic)**, or a pharmaceutically acceptable salt, prodrug or solvate thereof, as a medicament.

According to a further aspect of the invention there is provided a pharmaceutical composition comprising a compound of formula **(Ic)**, or a pharmaceutically acceptable salt, prodrug or solvate thereof, in admixture with a pharmaceutically-acceptable diluent or carrier.

According to a further aspect of the invention there is provided a pharmaceutical composition comprising a compound of formula **(Ic)**, or a pharmaceutically acceptable salt, prodrug or solvate thereof, in admixture with a pharmaceutically-acceptable diluent or carrier for the treatment of a warm-blooded animal, in need of treatment of disorders mediated by the neuropeptide Y5 receptor.

According to a further aspect of the invention there is provided a pharmaceutical composition comprising a compound of formula **(Ic)**, or a pharmaceutically acceptable salt, prodrug or solvate thereof, in admixture with a pharmaceutically-acceptable diluent or carrier for the treatment of eating disorders in a warm-blooded animal, in need of treatment.

According a further aspect of the invention there is provided the use of a compound of formula **(Ic)** in the manufacture of a medicament for the treatment, in a warm-blooded animal, of disorders mediated by the neuropeptide Y5 receptor or a pharmaceutically acceptable salt, prodrug or solvate thereof.

According to a further aspect of the invention there is provided the use of a compound of formula **(Ic)** or a pharmaceutically acceptable salt, prodrug or solvate thereof in the manufacture of a medicament for the treatment of eating disorders in a warm-blooded animal.

According to a further aspect of the invention there is provided a method of treatment, in a warm-blooded animal, of disorders mediated by the neuropeptide Y5 receptor comprising administering a therapeutically effective amount of a compound of formula **(Ic)** or a pharmaceutically acceptable salt, prodrug or solvate thereof.

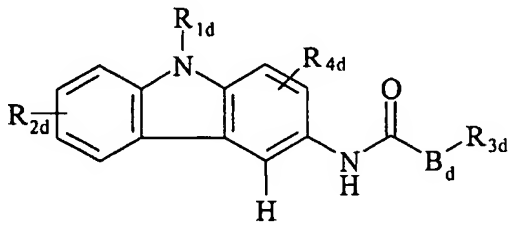
According to a further aspect of the invention there is provided a method of treatment, in a warm-blooded animal, of eating disorders, comprising administering a therapeutically effective amount of a compound of formula **(Ic)** or a pharmaceutically acceptable salt, prodrug or solvate thereof.

According to another feature of the invention there is provided the use of a compound of formula **(Ic)**, or a pharmaceutically acceptable salt, prodrug or solvate thereof, in the manufacture of a medicament for promoting weight loss.

According to a further aspect of the first feature of the invention there is provided a method of promoting weight loss, comprising administering a therapeutically effective amount of a compound of formula **(Ic)**, or a pharmaceutically acceptable salt, prodrug or solvate thereof.

According to a further aspect of the invention there is provided a pharmaceutical composition comprising a compound of formula **(Ic)**, or a pharmaceutically acceptable salt, prodrug or solvate thereof, in admixture with a pharmaceutically acceptable diluent or carrier for use in promoting weight loss.

According to the eighth feature of the invention there is provided a compound of formula **(Id)**:



(Id)

wherein:

$\mathbf{R_{1d}}$ is selected from C_{1-6}alkyl, C_{1-4}alkoxyC_{1-4}alkyl, C_{1-4}alkanoylC_{1-4}alkyl, aryl, arylC_{1-4}alkyl, arylC_{1-4}alkoxyC_{1-4}alkyl, heteroaryl, heteroarylC_{1-4}alkyl, heteroarylC_{1-4}alkoxyC_{1-4}alkyl, heterocyclyl, heterocyclylC_{1-4}alkyl, heterocyclylC_{1-4}alkoxyC_{1-4}alkyl, carbocyclyl, carbocyclylC_{1-4}alkyl, carbocyclylC_{1-4}alkoxyC_{1-4}alkyl, C_{1-4}alkylsulphonyl, *N,N*-di-C_{1-4}alkylaminosulphonyl or *N*-C_{1-4}alkylaminosulphonyl wherein R_{1d} may be optionally substituted (on an available carbon atom) by up to three substituents independently selected from: C_{1-4}alkyl optionally substituted by up to three fluoro substituents, C_{1-4}alkoxy, C_{1-4}alkanoyl, carboxy, hydroxy, halo, cyano,

amino, *N*-C_{1-4}alkylamino, *N,N*-di-C_{1-4}alkylamino, C_{1-4}alkanoylamino, mercapto, C_{1-4}alkylsulphonyl, C_{1-4}alkylsulphinyl, C_{1-4}alkylsulphanyl, nitro, heteroarylC_{1-4}alkanoylamino, or C_{1-4}alkoxycarbonyl;

$\mathbf{R_{2d}}$ is selected from hydrogen, C_{1-4}alkyl (optionally substituted by hydroxy), C_{1-4}alkoxy, cyano, nitro, halo, amino, *N*-C_{1-4}alkylamino, or *N,N*-di-C_{1-4}alkylamino;

$\mathbf{B_d}$ is selected from C_{1-10}alkylene, C_{2-10}alkenylene, C_{2-10}alkynylene, or a direct bond wherein the alkylene, alkenylene and alkynylene chains are optionally substituted by hydroxy, C_{1-4}alkoxy or amino;

$\mathbf{R_{3d}}$ is selected from hydrogen, hydroxy, C_{1-6}alkoxy, C_{1-6}alkanoyl, C_{1-6}alkanoyloxy, C_{1-6}alkanoylamino, C_{1-6}alkoxycarbonyl, aryl, aryloxy, arylcarbonyl, arylC_{1-4}alkyl, arylC_{1-4}alkoxy, arylC_{1-4}alkanoyl, aryloxycarbonyl, arylC_{1-4}alkoxycarbonyl, arylamino, diarylamino, arylsulphonyl, heteroaryl, heteroaryloxy, heteroarylC_{1-4}alkoxy, heteroarylcarbonyl, heteroarylC_{1-4}alkanoyl, heteroaryloxycarbonyl, heteroarylC_{1-4}alkoxycarbonyl, heteroarylC_{1-4}alkyl, heteroarylamino, heteroarylsulphonyl, diheteroarylamino, heterocyclyl, heterocyclyloxy, heterocyclylC_{1-4}alkoxy, heterocyclylcarbonyl, heterocyclylC_{1-4}alkanoyl, heterocyclyloxycarbonyl, heterocyclylC_{1-4}alkoxycarbonyl, heterocyclylC_{1-4}alkyl, heterocyclylamino, diheterocyclylamino, heterocyclylsulphonyl, carbocyclyl, carbocyclyloxy, carbocyclylC_{1-4}alkoxy, carbocyclylcarbonyl, carbocyclylC_{1-4}alkanoyl, carbocyclyloxycarbonyl, carbocyclylC_{1-4}alkoxycarbonyl, carbocyclylC_{1-4}alkyl, carbocyclylamino, carbocyclylsulphonyl, dicarbocyclylamino, cyano, carbamoyl, ureido, amino, *N*-C_{1-4}alkylamino, *N,N*-di-C_{1-4}alkylamino, C_{1-4}alkoxycarbonylamino, carbamoyl, *N*-C_{1-4}alkylcarbamoyl, *N,N*-di-C_{1-4}alkylcarbamoyl, C_{1-4}alkylsulphanyl, C_{1-4}alkylsulphinyl, C_{1-4}alkylsulphonyl, trifluoromethyl or fluoro wherein R_{3d} may be optionally substituted by up to three substituents independently selected from C_{1-4}alkyl, hydroxyC_{1-4}alkyl, C_{1-4}alkoxy, C_{1-6}alkoxycarbonyl, C_{2-6}alkenyloxycarbonyl, C_{1-4}alkanoyl, C_{1-4}alkanoylamino, C_{1-4}alkanoylthio, oxo, carboxy, hydroxy, halo, cyano, amino, *N*-C_{1-4}alkylamino, *N,N*-di-C_{1-4}alkylamino, *N*-C_{1-4}alkylaminoC_{1-4}alkyl, *N,N*-di-C_{1-4}alkylaminoC_{1-4}alkyl, carbamoyl, *N*-C_{1-4}alkylcarbamoyl, *N,N*-di-C_{1-4}alkylcarbamoyl, mercapto, C_{1-4}alkylsulphonyl, C_{1-4}alkylsulphinyl, C_{1-4}alkylsulphanyl, C_{1-4}alkylsulphonyloxyC_{1-4}alkyl, nitro, trifluoromethyl, trifluoromethylC_{1-4}alkyl, C_{1-6}alkoxycarbonylamino, C_{1-6}alkoxycarbonyl(N-C_{1-4}alkyl)amino,

aryl (optionally substituted by one C_{1-4}alkoxy or sulphamoyl), arylC_{1-4}alkyl, aryloxyC_{1-4}alkyl, arylcarbonyl, heteroaryl, heteroarylC_{1-4}alkyl, heteroaryloxyC_{1-4}alkyl, heteroarylcarbonyl, heterocyclyl, heterocyclylC_{1-4}alkyl, heterocyclyloxyC_{1-4}alkyl, heterocyclylcarbonyl, carbocyclyl, carbocyclylC_{1-4}alkyl, carbocyclyloxyC_{1-4}alkyl or carbocyclylcarbonyl; and

$\mathbf{R_{4d}}$ is selected from hydrogen, C_{1-4}alkyl, halo or nitro;

wherein the group "-B_d-R_{3d}" is linked to the carbonyl of the amide moiety via a carbon atom;

or a pharmaceutically acceptable salt, prodrug or solvate thereof;

with the provisos

1) if R_{2d} and R_{4d} are hydrogen: when R_{1d} is ethyl, the group "-B_d-R_{3d}" is not 1-*t*-butoxycarbonyl-3-hydroxypyrrolidin-5-yl, 1-*t*-butoxycarbonylpyrrolidin-5-yl, 1-(4-*t*-butoxybenzoyl)pyrrolidin-5-yl, 1-(benzo[b]fur-2-yl)pyrrolidin-5-yl, 1-benzyl-3-*t*-butylpyrazol-5-yl, 2-propen-2-yl, 2-carboxyphenyl, 1-(naphth-1-yl)ethylaminocarbonylmethyl, 4,5,6,7-tetrahydrobenzimidazol-6-yl, 5-(benzyloxycarbonylamino)-1-aminopentyl, benztriazol-6-yl, 4-ureido-1-aminobutyl, phenyl, ethenyl, 2-carboxyethenyl or methyl; when R_{1d} is methyl the group "-B_d-R_{3d}" is not methyl, 3-hydroxynaphth-2-yl, 2-hydroxynaphth-1-yl or trifluoromethyl; when R_{1d} is 2-cyanoethyl the group "-B_d-R_{3d}" is not 3-hydroxynaphth-2-yl; and when R_{1d} is 2-carboxyethyl, the group "-B_d-R_{3d}" is not 1-(*t*-butoxycarbonylamino)ethyl or methyl; and

2) when R_{2d} is 6-amino, 6-methyl or 6-nitro, R_{4d} is hydrogen and R_{1d} is ethyl, the group "-B_d-R_{3d}" is not methyl.

For the avoidance of doubt the statement "wherein the group "-B_d-R_{3d}" is linked to the carbonyl of the amide moiety via a carbon atom" is to be interpreted such that, for example, if R_{3d} is C_{1-6}alkoxy then B could not be a direct bond (in this example the group "-B_d-R_{3d}" would then be linked to the carbonyl of the amide moiety via an oxygen atom). The same applies when R_{3d} is other groups, for example arylamino and C_{1-4}alkylsulphanyl.

Preferably R_{1d} is C_{1-6}alkyl, optionally substituted (on an available carbon atom) by up to three halo substituents.

More preferably R_{1d} is selected from methyl, ethyl, *n*-propyl, *i*-propyl and 2,2,2-trifluoroethyl.

In one aspect of the invention particularly R_{1d} is *i*-propyl.

In another aspect of the invention particularly R_{1d} is ethyl or 2,2,2-trifluoroethyl.

Preferably R_{2d} is selected from hydrogen, C_{1-4}alkyl (optionally substituted by hydroxy) or halo.

More preferably R_{2d} is selected from hydrogen, hydroxymethyl or chloro.

Particularly R_{2d} is selected from hydrogen, 6-hydroxymethyl or 6-chloro.

More particularly R_{2d} is selected from hydrogen.

Preferably the group "$-B_d-R_{3d}$" forms methyl, phenyl, ethoxycarbonyl, isopropyl, 4-methylphenoxymethyl, 2-pyrid-4-ylethyl, 2-pyrid-4-ylethenyl, 2-pyrid-4-yl-1-methylethenyl, 2-pyrid-4-yl-1-methylethyl, 2-[3-(2-methoxyphenyl)-1,2,4-oxadiazol-5-yl]ethyl, 1-*t*-butoxycarbonylpiperid-4-yl, *t*-butoxycarbonylaminomethyl, aminomethyl, 4-methoxyphenethyl, 2-(1,3-benzodioxol-5-yl)ethyl, 2-(3-phenyl-1,2,4-oxadiazol-5-yl)ethyl, 3-(2-phenyl-1,3,4-oxadiazol-5-yl)propyl, 2-(3-benzyl-1,2,4-oxadiazol-5-yl)ethyl, 2-methoxyphenethyl, 3-phenylpropyl, 3-(3-pyrid-4-yl-1,2,4-oxadiazol-5-yl)propyl, 2-phenylcyclopropyl, 2-phenyl-1-methylethyl, 3-methoxyphenethyl, 4-fluorophenethyl, phenethyl, 3,4-dimethoxyphenethyl, 3,4,5-trimethoxyphenethyl, 3-(3-pyrid-2-yl-1,2,4-oxadiazol-5-yl)propyl, 4-mesylphenethyl, 3-trifluorophenethyl, piperid-1-yl, 2-fur-2-ylethyl, methoxycarbonylmethyl, cyclohexyl, *t*-butyl, 1-methylbutyl, cyanomethyl, *i*-butyl, 2-oxopyrrolidin-5-yl, cyclobutyl, 2-carbamoylethyl, 1-ethylpropyl, 2-oxotetrahydrofur-5-yl, 2-oxotetrahydrothiazol-4-yl, 1-methyl-1-phenylmethyl, 2,2,2-trifluoroethyl, ureidomethyl, methoxycarbonylaminomethyl, 1,2,4-triazol-1-ylmethyl, 1-methylpyrrolidin-2-yl, 1-methylpiperid-4-yl, 2-oxopyrrolidin-1-ylmethyl, 2-methoxycarbonylethyl, 2,3-dihydropyran-2-yl, 1-acetamidoethyl, *N,N*-dimethylaminomethyl, 2-prop-2-enyl, tetrahydropyran-2-yl, 2-pyrid-3-ylethenyl, imidazol-4-yl, methoxyethyl, *N,N*-dimethylcarbamoylethyl, pyrazol-4-yl, fur-2-ylmethyl, 5-methylisoxazol-3-yl, imidazol-1-ylethyl, 4-cyanophenyl, *N,N*-dimethylaminoethyl, 1-hydroxy-1-methyl-2,2,2-trifluoroethyl, 1-methyl-1-acetoxyethyl, 1-methyl-1-hydroxyethyl, 1-morpholinoprop-2-yl, thien-2-ylpropyl, 2-(3-bromoisoxazol-5-yl)ethyl, imidazol-4-ylethyl, 2-(pyrid-4-ylcarbonyl)ethyl, cyclopropyl, mesylmethyl, 1-*t*-butoxycarbonylamino-2-methoxyethyl, 1-methyl-2-(*t*-butoxycarbonylamino)ethyl, tetrazol-1-ylmethyl, 1,2,5-thiadiazol-3-yl, thiazol-4-yl, 1,2,4-triazol-1-ylethyl, 1,2,4-triazol-3-yl, fur-2-yl, thien-2-ylmethyl, 4-methylphenylsulphonylmethyl,

2-methoxy-1-aminoethyl, 1-amino-1-methylethyl, 2-chloro-3-methoxy-thien-4-yl, 3,5-dimethylisoxazol-4-yl, 1,2,3-thiadiazol-4-yl, 2-methylfur-4-yl, 1,1-dioxotetrahydrothien-3-ylmethyl, 3-amino-1,2,4-tetrazol-5-yl or isothiazol-5-yl.

More preferably the group "-B_d-R_{3d}" forms 2-oxotetrahydrothiazol-4-yl, 2-(3-bromoisoxazol-5-yl)ethyl, isothiazol-5-yl, imidazol-1-ylethyl or 2-oxopyrrolidin-1-ylmethyl.

Preferably R_{4d} is selected from hydrogen or C_{1-4}alkyl.

More preferably R_{4d} is selected from hydrogen or methyl.

Particularly R_{4d} is selected from hydrogen.

Preferred compounds of formula **(Id)** are:

9-ethyl-3-(2-oxotetrahydrothiazol-4-ylcarbonylamino)carbazole;

9-ethyl-3-[2-(3-bromoisoxazol-5-yl)ethylcarbonylamino]carbazole;

9-ethyl-3-(isothiazol-5-ylcarbonylamino)carbazole;

9-(2,2,2-trifluoroethyl)-3-(imidazol-1-ylethylcarbonylamino)carbazole;

9-(2,2,2-trifluoroethyl)-3-2-oxopyrrolidin-1-ylmethylcarbonylamino)carbazole;

or a pharmaceutically acceptable salt, prodrug or solvate thereof.

According to a further aspect of the invention there is provided the use of a compound of formula **(Id)**, or a pharmaceutically acceptable salt, prodrug or solvate thereof, as a medicament.

According to a further aspect of the invention there is provided a pharmaceutical composition comprising a compound of formula **(Id)**, or a pharmaceutically acceptable salt, prodrug or solvate thereof, in admixture with a pharmaceutically-acceptable diluent or carrier.

According to a further aspect of the invention there is provided a pharmaceutical composition comprising a compound of formula **(Id)**, or a pharmaceutically acceptable salt, prodrug or solvate thereof, in admixture with a pharmaceutically-acceptable diluent or carrier for the treatment of a warm-blooded animal, in need of treatment of disorders mediated by the neuropeptide Y5 receptor.

According to a further aspect of the invention there is provided a pharmaceutical composition comprising a compound of formula **(Id)**, or a pharmaceutically acceptable salt, prodrug or solvate thereof, in admixture with a pharmaceutically-acceptable diluent or carrier for the treatment of eating disorders in a warm-blooded animal, in need of treatment.

According a further aspect of the invention there is provided the use of a compound of formula **(Id)** in the manufacture of a medicament for the treatment, in a warm-blooded animal, of disorders mediated by the neuropeptide Y5 receptor or a pharmaceutically acceptable salt, prodrug or solvate thereof.

According to a further aspect of the invention there is provided the use of a compound of formula **(Id)** or a pharmaceutically acceptable salt, prodrug or solvate thereof in the manufacture of a medicament for the treatment of eating disorders in a warm-blooded animal.

According to a further aspect of the invention there is provided a method of treatment, in a warm-blooded animal, of disorders mediated by the neuropeptide Y5 receptor comprising administering a therapeutically effective amount of a compound of formula **(Id)** or a pharmaceutically acceptable salt, prodrug or solvate thereof.

According to a further aspect of the invention there is provided a method of treatment, in a warm-blooded animal, of eating disorders, comprising administering a therapeutically effective amount of a compound of formula **(Id)** or a pharmaceutically acceptable salt, prodrug or solvate thereof.

According to another feature of the invention there is provided the use of a compound of formula **(Id)**, or a pharmaceutically acceptable salt, prodrug or solvate thereof, in the manufacture of a medicament for promoting weight loss.

According to a further aspect of the first feature of the invention there is provided a method of promoting weight loss, comprising administering a therapeutically effective amount of a compound of formula **(Id)**, or a pharmaceutically acceptable salt, prodrug or solvate thereof.

According to a further aspect of the invention there is provided a pharmaceutical composition comprising a compound of formula **(Id)**, or a pharmaceutically acceptable salt, prodrug or solvate thereof, in admixture with a pharmaceutically acceptable diluent or carrier for use in promoting weight loss.

A preferred group of values for the substituents described in first feature (and within each feature) of the invention described herein, are:

$\mathbf{R_1}$ is C_{1-4}alkyl, C_{1-4}alkanoyl, arylC_{1-4}alkanoyl, aryloxy, heteroarylC_{1-4}alkanoyl, or heteroaryloxy, optionally substituted as above;

$\mathbf{R_2}$ is hydrogen;

A is -NH-C(O)-O-;

B is C_{1-6}alkylene, C_{2-6}alkenylene

$\mathbf{R_3}$ is hydrogen, alkoxy, aryl, aryloxy, heteroaryl, heteroaryloxy, heterocyclyl, or heterocyclyloxy, optionally substituted as above.

$\mathbf{R_4}$ is nitro or hydrogen.

A further preferred group of values for the substituents described in the first feature of the invention described herein, are:

$\mathbf{R_1}$ is C_{1-4}alkyl, C_{1-4}alkanoyl, arylC_{1-4}alkanoyl, aryloxy, heteroarylC_{1-4}alkanoyl, or heteroaryloxy, optionally substituted as above;

$\mathbf{R_2}$ is hydrogen;

A is -NH-C(O)-NH-, or -NH-C(O)-NC_{1-4}alkyl)-,

B is C_{1-6}alkylene, C_{2-6}alkenylene

$\mathbf{R_3}$ is hydrogen, alkoxy, aryl, aryloxy, heteroaryl, heteroaryloxy, heterocyclyl, or heterocyclyloxy, optionally substituted as above; and

$\mathbf{R_4}$ is nitro or hydrogen.

A further preferred group of values for the substituents described in the first feature of the invention described herein, are:

$\mathbf{R_1}$ is C_{1-4}alkanoyl, arylC_{1-4}alkanoyl, aryloxy, heteroarylC_{1-4}alkanoyl, or heteroaryloxy, optionally substituted as above;

$\mathbf{R_2}$ is hydrogen;

A is -NH-C(O)-;

B is C_{1-6}alkylene, C_{2-6}alkenylene

$\mathbf{R_3}$ is hydrogen, alkoxy, aryl, aryloxy, heteroaryl, heteroaryloxy, heterocyclyl, or heterocyclyloxy, optionally substituted as above; and

$\mathbf{R_4}$ is nitro or hydrogen.

A more preferred group of values for the substituents described the first feature of the invention described herein, are:

$\mathbf{R_1}$ is C_{1-4}alkyl;

$\mathbf{R_2}$ is hydrogen;

A is -NH-C(O)-;

B is C_{1-6}alkylene, C_{2-6}alkenylene

R_3 is hydrogen, alkoxy, aryl, aryloxy, heteroaryl, heteroaryloxy, heterocyclyl, or heterocyclyloxy; and

R_4 is nitro or hydrogen.

For the avoidance of doubt it should be noted that when these preferred groups of values for R_1, R_2, A, B, R_3 and R_4 are applied to each feature of the invention then the respective provisos also apply.

Particular compounds of the invention are:

N-(9-ethyl-9H-carbazol-3-yl)-2,2-dimethylpropionamide;

N-(9-ethyl-9H-carbazol-3-yl)-2-(2-oxopyrolidine-1-ylacetamide;

N-(9-ethyl-9H-carbazol-3-yl)-3-(imidazol-1-yl)propionamide;

1-methyl-1-(pyridin-4-ylethyl)-3-(9-ethyl-9H-carbazol-3-yl) urea;

1-methyl-1-(*N*,*N*-dimethylaminoethyl)-3-(9-ethyl-9H-carbazol-3-yl) urea; and

1-(4-hydroxycyclohex-1-yl)-3-(9-ethyl-9H-carbazol-3-yl) urea.

More particular compounds of the invention are:

N-(9-ethyl-9H-carbazol-3-yl)-2-(1,2,4-triazole-1-ylacetamide;

N-(9-ethyl-9H-carbazol-3-yl)-4-morpholine carboxamide;

1-(9-ethyl-9H-carbazol-3-yl)-3-(*N*-methylpiperidin-4-yl)-3-methyl urea; and

N-(9-methylsulfonyl-9H-carbazol-3-yl)morpholine 4-carboxamide.

Particular compounds of the invention or of the first feature of the invention are:

N-(9-ethyl-9H-carbazol-3-yl)-3-pyridin-4-ylpropanamide

N-(9-ethyl-9H-carbazol-3-yl)-3-[3-(2-methoxyphenyl)-1,2,4-oxadiazol-5-yl]propanamide

N-(9-ethyl-9H-carbazol-3-yl)-2-methyl-3-pyridin-4-ylpropanamide

(E)-N-(9-ethyl-9H-carbazol-3-yl)-2-methyl-3-pyridin-4-ylprop-2-enamide

N-(9-methyl-9H-carbazol-3-yl)-3-pyridin-4-ylpropanamide

N-(9-benzoyl-9H-carbazol-3-yl)-3-pyridin-4-ylpropanamide

N-(9-ethyl-9H-carbazol-3-yl)-2-methylpropanamide

Isopropyl-N-(9-ethyl-9H-carbazol-3-yl)carbamate

1,1-diethyl-3-(9-ethyl-9H-carbazol-3-yl) urea

1-(9-ethyl-9H-carbazol-3-yl)-3-(2,6-diethylphenyl) urea

N-(9-ethyl-9H-carbazol-3-yl)-2-(4-methylphenyloxy) ethanamide

N-(9-ethyl-9H-carbazol-3-yl) ethanamide

phenyl-N-(9-ethyl-9H-carbazol-3-yl)carbamate

phenylmethyl-N-(9-ethyl-9H-carbazol-3-yl)carbamate

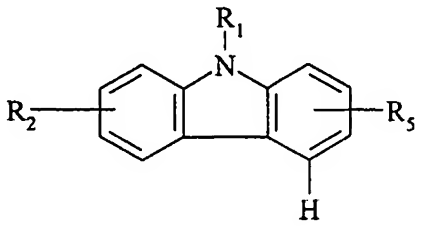
A carbazole derivative of formula **(I)**, or a pharmaceutically-acceptable salt or *in vivo* hydrolysable ester thereof, may be prepared by any process known to be applicable to the preparation of chemically related compounds. These processes may additionally be used to form a carbazole derivative of formula **(I)** or a pharmaceutically acceptable salt, prodrug or solvate thereof. Such processes, when used to prepare carbazole derivative of formula **(I)**, or a pharmaceutically-acceptable salt or *in vivo* hydrolysable ester thereof, or a carbazole derivative of formula **(I)**, or a pharmaceutically acceptable salt, prodrug or solvate thereof, are provided as a further feature of the invention and are illustrated by the following representative examples in which R_1, R_2, A, B, R_3 and R_4 have the same meaning as herein before defined. R_1 or R_3 bear the same optional substituents as described herein unless another substituent is drawn thereon (optionally protected as necessary). The reader is referred to Advanced Organic Chemistry, 4th Edition, by Jerry March, published by John Wiley & Sons 1992, for general guidance on reaction conditions and reagents. The reader is referred to Protective Groups in Organic Synthesis 2nd Edition, by Green et al, published by John Wiley & Sons for general guidance on protecting groups.

Carbazoles of the invention can be synthesised from the respective R_1- and R_2-substituted 2- or 3-aminocarbazole derivative or 2- or 3-carboxycarbazole derivative as appropriate.

Many carbazole derivatives which can be used as starting points for synthesis of compounds of formula **(I)**-**(V)** are known in the art. For example 3-aminocarbazole (Aldrich Chemical Company), 3-amino-9-ethyl-carbazole (Aldrich Chemical Company), 3-carboxy carbazole [Preston et al (1942) J. Chem. Soc. 500-504, 2-carboxycarbazole [Narashimhan et al (1983) Indian J Chem Sect. B 22B(10), 1004-10], 2-hydroxycarbazole [Haase (1963) J Prakt. Chem. 20, 161], 2-formylcarbazole [Molina et al (1993) Tetrahedron 49, 1223-1236 or 3-nitrocarbazole [Chakrabarty et al (1994) Synthetic Communications 24, 1-10]. In the following processes it is advisable to maintain the 2- or 3- amino group on the carbazole ring as a nitro group until the R_1 group has been incorporated and then reducing the nitro group to an amino group. Likewise it is advisable to maintain the 2-carboxy or 3-carboxy group on the carbazole ring as the aldehyde until the R_1 group has been incorporated and then oxidising the

aldehyde to the carboxylic acid. The skilled man would be able to adapt processes described herein and processes known in the art to produce other suitable starting materials for the synthesis of compounds of the invention.

Carbazole derivatives of formula (V) wherein R_5 is an nitro or formyl group, can be prepared as starting points for synthesis of compounds of the invention as follows:



(V)

(1) 3-amino-6-alkyl-9-ethylcarbazole

6-Alkylcarbazole [Luo (1989) Journal of Heterocyclic Chemistry 26, 1213] can be converted to 3-nitro-6-alkyl-9-ethylcarbazole as follows. Reaction with ethyl iodide or diethyl sulphate in the presence of a base (e.g. sodium hydride, sodium hydroxide or potassium carbonate) in a solvent such as DMF or *N*-methylpyrrolidinone to give 6-alkyl-9-ethylcarbazole, followed by a standard nitration procedure (nitric acid in a suitable solvent, such as acetic acid, at a temperature of 0 - 25°C).

A person skilled in the art could produce alternative R_1 substitutions as follows. 6-alkylcarbazole could be converted to 3-nitro-6-alkylcarbazole using ceric ammonium nitrate in a suitable solvent, such as chloroform in the presence of SiO_2under reflux [Chakrabarty & Batabyal (1994) Synthetic Communications 24, 1-10). R_1 substituents could then be added as described below. Finally the nitro group could be reduced to the amino using standard conditions.

(2) 3-amino-6-halo-9-aminocarbazole

3-nitro-6-halo-9-aminocarbazole [J. Prakt. Chem. (1996) 338, 731-737.

(3) 3-amino-6-alkoxy-9-alkyl-carbazole

This compound can be produced as follows: 6-methoxy-1,2,3,4-tetrahydrocarbazole is produced by a Fischer indole synthesis as follows, Para-alkoxyphenylhydrazine is reacted with cyclohexanone in cold dilute acid at room temperature followed by heating at a temperature in the range of 80 - 100°C in the presence of glacial acetic acid or dilute sulphuric acid. This can then be dehydrogenated to the 6-alkoxycarbazole in the presence of palladium

on carbon at a temperature of about 280°C. 6-alkoxycarbazole can then be alkylated using an alkyl iodide or an alkyl sulphate in the presence of a base (e.g. potassium carbonate) in a suitable solvent such as DMF, followed by nitration using standard conditions as described above. Alternatively 6-alkoxycarbazole can be derivatised at R_2 as described below followed by nitration using ceric ammonium nitrate.

(4) 3-amino-6-cyano-9-ethyl-carbazole

3-Formylcarbazole can be converted into the corresponding oxime using hydroxylamine in a suitable solvent, such as ethanol. The oxime can then be converted to the nitrile by heating at a temperature of 80 - 120°C with acetic anhydride or phorporous oxychloride in the absence of solvent. 3-cyanocarbazole can then be nitrated under standard conditions using for example ceric ammonium nitrate or nitric acid and acetic acid as described above. An analogous reaction can also be performed using the 1-formylcarbazole

(5) 6-amino carbazole derivatives

3-Amino-9-ethylcarbazole can be reacted with acetic anhydride or acetyl chloride to form the corresponding amide. This can then be nitrated on the 6-position of the carbazole ring using standard nitration conditions as described above, followed by reduction of the nitro group to the amine and hydrolysis of the amide using dilute hydrochloric acid at a temperature of 80 - 100°C to form the 3,6-diaminocarbazole.

The skilled man would be able to use analogous methodology to produce di-aminocarbazole derivatives with substituents at R_1 other than an alkyl chain.

(6) 7-substituted carbazole derivatives

2-Formylcarbazole can be oxidised using standard conditions (e.g. potassium permanganate in a suitable solvent such as water or aqueous acetone, at 20 - 100°C temperature) to form the carboxylic acid. This can then converted to a amino group by a Curtius reaction using diphenylphosphoryl azide in dioxane in the presence of benzyl alcohol followed by heat to form the isocyanate. This is then reacted with tertiary butyl alcohol, followed by trifluoroacetic acid to form the amine. The amine can then subjected to a diazotisation reaction using nitrous acid in a suitable solvent, such as water at a temperature of -5 - 10°C, to form the 2-diazo-substituted carbazole. The diazo group can then be reacted with a number of compounds to form 2-substituted carbazoles, such as copper chloride to form 2-chlorocarbazole derivative or copper cyanide to form 2-cyanocarbazole. These 2-derivatives

can then be nitrated as described above to produce the corresponding 7-substituted 3-nitrocarbazole.

A number of approaches are available to add substituents at R_1 on the carbazole ring.

(1) aryl and heteroaryl groups

Aryl, substituted aryl, heteroaryl and substituted heteroaryl groups can be added by palladium-catalysed reaction of a carbazole with an aryl halide [Mann et al (1998) Journal of the American Chemical Society 120, 827-828].

(2) aryl groups

Aryl groups and substituted aryl groups can be added using the appropriate triphenylbismuth bis-trifluoroacetate derivative [Barton et al (1988) Tetrahedron Letters 29, 1115-1118].

(3) alkyl group and substituted alkyl groups

An R_2 substituted carbazole can be reacted with the appropriate alkyl halide or substituted alkyl halide to form the corresponding 9-alkyl or alkyl-substituted-9-alkyl substituted carbazole. This can be performed in the presence of a base e.g. potassium hydroxide in a suitable solvent such as DMSO or using sodium hydride in a suitable solvent such as DMF. The resulting substituted carbazole can be nitrated using standard conditions e.g. nitric acid in acetic acid at a temperature of 0 - 25°C. This is followed by reduction to the amine using standard conditions such as hydrogen gas in the presence of 10% palladium on carbon in a suitable solvent such as ethyl acetate or ethanol at a temperature of 0 - 30°C.

The skilled man would know how to prepare the appropriate protected alkylamino compounds to add alkylamino groups and *N*-substituted alkylamino groups at R_1.

(4) alkanoyl groups or substituted alkanoyl groups, aryl carbonyl or heteroaryl carbonyl groups

The appropriate 2- or 3-nitro carbazole or 2- or 3-formylcarbazole can be reacted with the appropriate acid chloride or acid anhydride in a suitable solvent such as chloroform or DMF at a temperature of 0 - 80°C. Alternatively the appropriate 2- or 3-nitro carbazole can be reacted with the appropriate carboxylic acid with a carbodiimide, such as EDAC and DMAP in a suitable solvent, such as DCM or chloroform in the presence of a base such as triethylamine at room temperature.

(5) alkylsulphonyl groups, *N*-alkylaminosulponyl groups

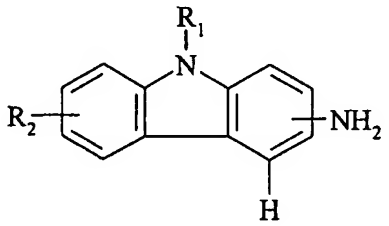
A compound of formula **(V)** can be reacted with the appropriate alkylsulponyl halide or substituted alkylsulphonyl halide to form the corresponding alkylsulphonyl-substituted compound. This can be performed in the presence of a base e.g. sodium hydroxide in a suitable solvent such as THF or DMF or using sodium hydride in a suitable solvent such as DMF.

The skilled man would know how to prepare the appropriate protected alkylaminosulphonyl compounds to add alkylamino groups and *N*-substituted alkylamino groups at R_1.

A number of approaches are available to add groups of the formula R_5-R_6 to the 2- or 3- position of the carbazole ring of formula **(VI)** to form compounds of formula **(I)**, wherein R_5 is a amino or carboxyl group and R_6 is a group of the formula -A'-B-R_3, wherein A' is a precursor to the group A producing group A when reacted with the amino or carboxyl group on the carbazole ring. These include

(1) Compounds of formula **(I)** where A is -NH-C(O)-

These can be prepared by reacting a carbazole of formula **(VI)**



(VI)

with a carboxylic acid of formula $HOOCR_6$ to form an amide. Coupling of amino groups with carboxylic acids are well known in the art and can be facilitated by a number of chemical reactions using an appropriate coupling reagent. For example a carbodiimide coupling reaction can be performed with EDAC in the presence of DMAP in a suitable solvent such as DCM, chloroform or DMF at room temperature.

(2) Compounds of formula **(I)** where A is -NH-C(O)-

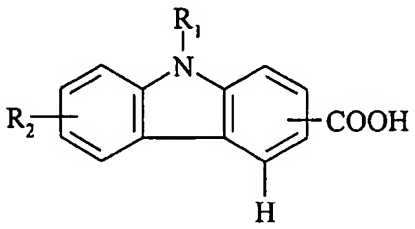
These can also be prepared by reacting a carbazole of formula **(VI)** with an acid chloride of formula $ClC(O)R_6$, in the presence of a base, such as triethylamine or pyridine, in a suitable solvent such as chloroform or DCM at a temperature between 0°C and room temperature.

(3) Compounds of formula **(I)** where A is -NH-S(O_2)-.

These can be prepared by reacting a carbazole of formula **(VI)** with a sulphonyl chloride of formula $ClSO_2R_6$ in the presence of a base, such as triethylamine or pyridine, in a suitable solvent such as chloroform or DCM at a temperature between 0°C and room temperature.

(4) Compounds of formula **(I)** where A is -C(O)-NH-.

These can be prepared by reacting a carbazole of formula **(VII)**



(VII)

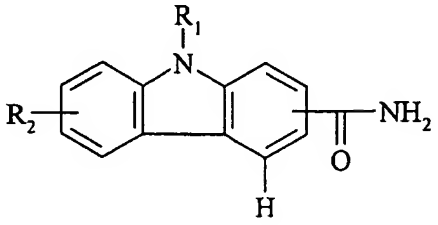
with an amine of formula NH_2R_6. Methodology is identical to processes described in (1) above in this section. Compounds of formula **(I)** where A is -C(O)-N(C_{1-4}alkyl)- can also be produced by this method using a secondary amine of formula NH(C_{1-4}alkyl)R_6.

(5) Compounds of formula **(I)** where -A-B-R_3 is -C(O)-NH_2,

These can be prepared by reacting a carbazole of formula **(VII)** with an alkylchloroformate in a suitable solvent, such as DCM or chloroform, at a temperature between -10°C and 0°C to form the mixed anhydride. This is followed by reacting with the ammonium hydroxide at room temperature in a suitable solvent, such as chloroform. This reaction can also be used to create secondary amides if the ammonium hydroxide is substituted with the appropriate amino compound.

(6) Compounds of formula **(I)** wherein A is -CH_2NH-.

These can be prepared by reduction of the compound of formula **(VIII)**



(VIII)

as prepared using process (4) in this section using lithium aluminium hydride in an inert solvent such as THF at a temperature of 0°C under argon, followed by refluxing. This can be followed by reaction of the amino group with a group of the formula HOOC-R_6 as described above.

(7) Compounds of formula **(I)** wherein A is -NHC(O)O-

These can be prepared by reacting a carbazole of formula **(VI)** with a chloroformate of formula $ClC(O)OR_6$ or a carbonate of formula $(R_6O)_2CO$ in a suitable solvent, such as DCM or chloroform, in the presence of a base, such as *N*-methylmorpholine, pyridine or triethylamine, at a temperature between -10°C and 0°C.

(8) Alkyl substitution can be introduced onto the nitrogen groups within group A of formula **(I)** by reacting the corresponding non-alkylated nitrogen carbazole derivative of formula **(I)** with an alkyl iodide e.g. methyl iodide in the presence of sodium hydride in an inert solvent such as THF at 0°C under argon, followed by heating to 50°C.

Alkyl substitution on one or both nitrogen atoms in group A in formula **(I)** wherein group A is -NHC(O)NH- can be facilitated as follows:

A carbazole of formula **(VI)** is reacted with an aldehyde of formula R_7CHO, wherein R_7 is C_{1-4}alkyl in the presence of sodium cyanoborohydride in a suitable solvent, such as acetic acid, at a temperature between room temperature and 60°C. The resulting secondary amine or a compound of formula **(VI)** is reacted with phenylchloroformate, in a suitable solvent, such as DCM or chloroform, in the presence of a base, such as triethylamine at a temperature of -10 - 0°C. This is then reacted with R_8NHR_6 under the same conditions, wherein R_8 is either hydrogen or C_{1-4}alkyl to form the *N*-substituted urea derivative. Non-*N*-substituted urea derivatives of the invention can also be make by this approach.

(9) Compounds of formula **(I)** wherein A is -NHC(O)NH-

These can be produced by reacting a carbazole of formula **(VI)** with an isonitrile of formula CNR_6, in a suitable solvent, such as chloroform or DCM, in the presence of a base such as triethylamine at a temperature between 0°C and room temperature.

(10) Compounds of formula **(I)** wherein -A-B-R_3 is -N-R_3 wherein R_3 is a 2-linked heterocycle

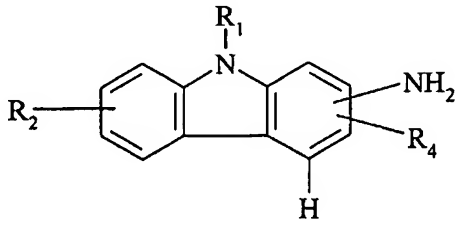
These can be produced by reacting a carbazole of formula **(V)** with a 2-chloroheterocycle in a suitable solvent, such as isopropanol, DMF or DMA in the presence or absence of an acid, such as hydrochloric acid at a temperature of about 85°C.

A person skilled in the art would be able to generate appropriate compounds, of the formula R_5-R_6, to react with compounds of formula (V) to produce compounds of formula (I) wherein R_5 is a amino or carboxyl group and R_6 is a group of the formula -A'-B-R_3, wherein A' is an appropriate group to produce the group A when reacted with the amino or carboxyl group on the carbazole ring.

It will be appreciated that, in certain steps in the reaction sequence to compounds of the formula (I), it will be necessary to protect certain functional groups in intermediates in order to prevent side reactions. De-protection may be carried out at a convenient stage in the reaction sequence once protection is no longer required.

Therefore, another aspect of the present invention provides a process for preparing a compound of formula (I) or a pharmaceutically acceptable salt, prodrug or solvate thereof which process (wherein R^1, R^2, R^3, R^4, A and B are, unless otherwise specified, as defined in formula (I)) comprises of:

Process a): for compounds of formula (I) wherein the group -A-B-R^3 forms a side chain of the formula -NH-C(O)-X or -NH-$S(O)_2$-X; wherein X defines a group such that -NH-C(O)-X or -NH-$S(O)_2$-X falls within the definition of -A-B-R^3 above (and with the proviso that X is not linked to the -NH-$S(O)_2$- moiety via an oxygen); reacting an amine of formula (A):



(A)

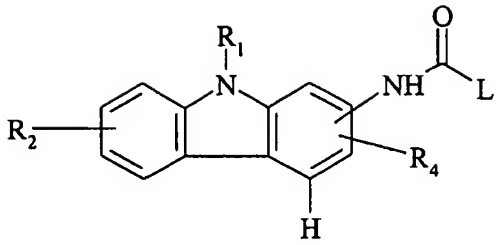
with a compound of formula (B):

M-W-X

(B)

wherein W is -C(O)- or -$S(O)_2$-; M is a displaceable group or M may be OH if W is -C(O)-; or

Process b): for compounds of formula (I) wherein the group -A-B-R^3 forms a side chain of the formula -NH-C(O)-N(Y)(Z); wherein Y and Z define groups such that -NH-C(O)-N(Y)(Z) falls within the definition of -A-B-R^3 above; by reacting a compound of formula (C):



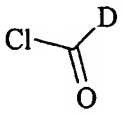
(C)

wherein L is a displaceable group; with an amine of formula **(D)**:

HNYZ

(D)

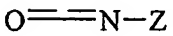
Process c): for compounds of formula **(I)** wherein the group -A-B-R^3 forms a side chain of the formula -NH-C(O)-N(Y)(Z) or -NH-C(O)-O-Q; wherein Y, Z and Q define groups such that -NH-C(O)-N(Y)(Z) and -NH-C(O)-O-Q fall within the definition of -A-B-R^3 above; reacting an amine of formula **(A)** with a compound of formula **(E)**:



(E)

wherein D is -N(Y)(Z) or -O-Q;

Process d): for compounds of formula **(I)** wherein the group -A-B-R^3 forms a side chain of the formula -NH-C(O)-NH-Z; wherein Z defines a group such that -NH-C(O)-NH-Z falls within the definition of -A-B-R^3 above; reacting an amine of formula **(A)** with an isocyanate of formula **(F)**:



(F)

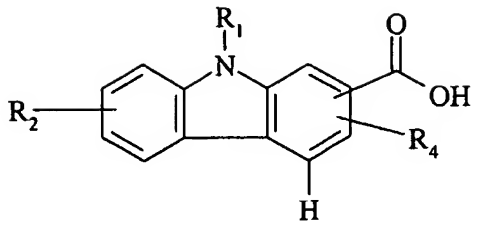
Process e): reacting a compound of formula **(I)** wherein R^1 is hydrogen; with a compound of formula **(G)**:

R^1-L

(G)

wherein R^1 is not hydrogen and L is a displaceable group;

Process f): for compounds of formula **(I)** wherein the group -A-B-R^3 forms a side chain of the formula -C(O)-NH-V; wherein V defines groups such that -C(O)-NH-V falls within the definition of -A-B-R^3 above; by reacting an acid of formula **(H)**:



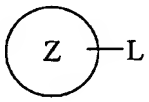
(H)

or an activated derivative thereof; with an amine of formula (J):

$V\text{-}NH_2$

(J)

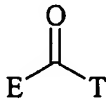
Process g): for compounds of formula (I) wherein the group -A-B-R^3 forms a group of the formula -NH-Ring Z wherein Ring Z is a aryl, heteroaryl, heterocyclyl or carbocyclyl ring (optionally substituted as defined above); reacting an amine of formula (A) with a compound of formula (K):



(K)

wherein L is a displaceable group;

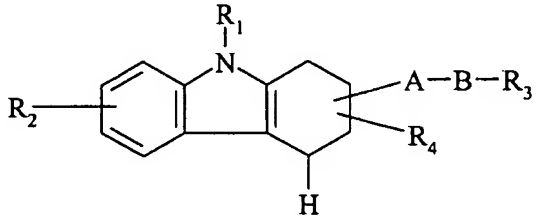
Process h): for compounds of formula (I) wherein the group R^1 is attached to the nitrogen of the carbazole via a -CH- or -CH_2- group; by reacting a compound of formula (I) wherein R^1 is hydrogen with a compound of formula (L):



(L)

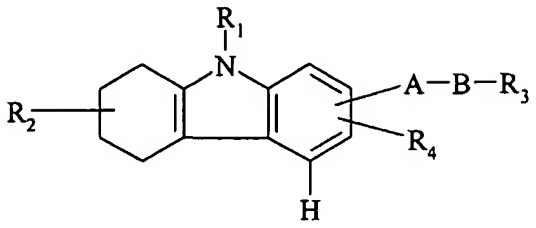
wherein E and T are groups such that (E)(T)CH- would form a group of the formula R^1;

Process i): by oxidation of compounds of formula (M):



(M)

Process j): by oxidation of compounds of formula **(N)**:



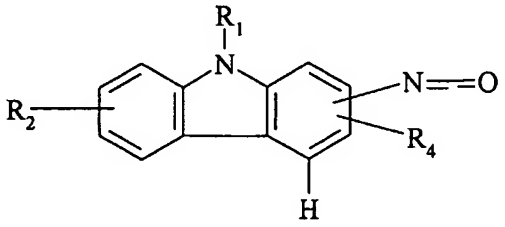
(N)

Process k): for compounds of formula **(I)** wherein the group -A-B-R^3 forms a side chain of the formula -NH-C(O)-NH-Z; wherein Z defines a group such that -NH-C(O)-NH-Z falls within the definition of -A-B-R^3 above; reacting an amine of formula **(O)**:

$$Z\text{-}NH_2$$

(O)

with an isocyanate of formula **(P)**:



(P)

and thereafter if necessary:

i) converting a compound of the formula **(I)** into another compound of the formula **(I)**;

ii) removing any protecting groups;

iii) forming a pharmaceutically acceptable salt, prodrug or solvate.

The skilled man will appreciate that where a process is suitable for preparing compounds where A is selected from, -NH- or -NHC(O)-, these reactions would also be suitable for preparing the homologues: -CH_2NH- and-CH_2NHC(O)-.

L and M are displaceable groups. Suitable values for L or M are halo for example chloro or bromo; or phenols for example *p*-nitrophenol or pentafluorophenol.

Specific reaction conditions for the above reactions are as follows.

Process a) The reaction of compounds of formula **(A)** and **(B)** where M is a displaceable group is well known in the art, for example they may be reacted in the presence of a base, for example triethylamine, pyridine, or 2,6-di-*alkyl*-pyridines such as 2,6-lutidine or

2,6-di-*tert*-butylpyridine, and in a suitable solvent, such as DMA, DCM, benzene, THF and DMF. The reaction may conveniently be performed at a temperature in the range of -40 to 140°C.

Where M is OH and W is -C(O)-, amines of formula **(A)** and acids of formula **(B)** may be coupled together in the presence of a suitable coupling reagent. Standard peptide coupling reagents known in the art can be employed as suitable coupling reagents, or for example carbonyldiimidazole and dicyclohexyl-carbodiimide, optionally in the presence of a catalyst such as dimethylaminopyridine or 4-pyrrolidinopyridine, optionally in the presence of a base such as those described above. Suitable solvents include those described above. The coupling reaction may conveniently be performed at a temperature in the range of -40 to 140°C.

Processes b and c) Compounds of formula **(C)** and **(D)** and amines of formula **(A)** and **(E)** may be reacted together in the presence of a suitable base, for example triethylamine, pyridine, or 2,6-di-*alkyl*-pyridines such as 2,6-lutidine or 2,6-di-*tert*-butylpyridine, or excess **(A)** or **(D)**, in a suitable solvent such as dichloromethane, ethyl acetate or tetrahydrofuran. The reaction may conveniently be performed at a temperature in the range of -40 to 50°C.

Process d) Amines of formula **(A)** and compounds of formula **(F)** may be reacted in the presence of a suitable solvent, such as toluene, dichloromethane or tetrahydrofuran.

Process e) Compounds of formula **(I)** wherein R^1 is hydrogen may be reacted with compounds of formula **(G)** under standard alkylation, acylation and sulphonylation conditions. For example in the presence of a base, such as an inorganic base for example sodium carbonate or sodium hydroxide, in the presence of an inert solvent for example tetrahydrofuran or toluene and at a temperature in the range of 50-120°C, preferably at or near reflux.

Process f) Acids of formula **(H)** and amines of formula **(J)** may be reacted together under standard peptide coupling conditions, for example those described in *Process a)* above.

Suitable activated acid derivatives include acid halides, for example acid chlorides, and active esters, for example pentafluorophenyl esters.

Process g) Amines of formula **(A)** and compounds of formula **(K)** may be reacted together either directly in the presence of a suitable high boiling solvent for example toluene or DMF, with or without additional base (suitable examples include those described above), or they

may be reacted together under standard transition metal (for example palladium) cross coupling reaction conditions. Such conditions are well documented in the art.

Process h) Compounds of formula **(I)** wherein R^1 is hydrogen and compounds of formula **(L)** may be reacted with amines under standard reductive amination conditions. For example in the presence of a reducing agent such as hydrogen and a hydrogenation catalyst (for example palladium on carbon), or zinc and hydrochloric acid, or sodium cyanoborohydride, or sodium triacetoxyborohydride, or sodium borohydride, iron pentacarbonyl and alcoholic potassium hydroxide, or borane and pyridine or formic acid. The reaction is preferable carried out in the presence of a suitable solvent such as an alcohol, for example methanol or ethanol, and at a temperature in the range of 0-50°C, preferably at or near room temperature.

Processes i) and j) 1,2,3,4-tetrahydrocarbazole may be oxidised under standard conditions, for example in a suitable solvent such as toluene or xylene, using a suitable oxidising agent for example 2,3-dichloro-5,6-dicyano-1,4-benzoquinone and at a temperature at or near reflux.

Process k) Amines of formula **(O)** and isocyanates of formula **(P)** may be reacted together under conditions such as those described in *Process d)* above.

Isocyanates of formula **(P)** may be generated *in situ* from the corresponding carboxylic acid under standard Curtis re-arrangement conditions.

It will be appreciated that certain of the various ring substituents in the compounds of the present invention may be introduced by standard aromatic substitution reactions or generated by conventional functional group modifications either prior to or immediately following the processes mentioned above, and as such are included in the process aspect of the invention. Such reactions and modifications include, for example, introduction of a substituent by means of an aromatic substitution reaction, reduction of substituents, alkylation of substituents and oxidation of substituents. The reagents and reaction conditions for such procedures are well known in the chemical art. Particular examples of aromatic substitution reactions include the introduction of a nitro group using concentrated nitric acid, the introduction of an acyl group using, for example, an acyl halide and Lewis acid (such as aluminium trichloride) under Friedel Crafts conditions; the introduction of an alkyl group using an alkyl halide and Lewis acid (such as aluminium trichloride) under Friedel Crafts conditions; and the introduction of a halo group. Particular examples of modifications include the reduction of a nitro group to an amino group by for example, catalytic hydrogenation with

a nickel catalyst or treatment with iron or tin in the presence of hydrochloric acid with heating; oxidation of alkylthio to alkylsulphinyl or alkylsulphonyl. The reader is referred to Advanced Organic Chemistry, 4th Edition, by Jerry March, published by John Wiley & Sons 1992, for general guidance on reaction conditions and reagents.

It will also be appreciated that in some of the reactions mentioned herein it may be necessary/desirable to protect any sensitive groups in the compounds. The instances where protection is necessary or desirable and suitable methods for protection are known to those skilled in the art. Conventional protecting groups may be used in accordance with standard practice (for illustration see T.W. Green, Protective Groups in Organic Synthesis, John Wiley and Sons, 1991). Thus, if reactants include groups such as amino, carboxy or hydroxy it may be desirable to protect the group in some of the reactions mentioned herein.

A suitable protecting group for an amino or alkylamino group is, for example, an acyl group, for example an alkanoyl group such as acetyl, an alkoxycarbonyl group, for example a methoxycarbonyl, ethoxycarbonyl or *t*-butoxycarbonyl group, an arylmethoxycarbonyl group, for example benzyloxycarbonyl, or an aroyl group, for example benzoyl. The deprotection conditions for the above protecting groups necessarily vary with the choice of protecting group. Thus, for example, an acyl group such as an alkanoyl or alkoxycarbonyl group or an aroyl group may be removed for example, by hydrolysis with a suitable base such as an alkali metal hydroxide, for example lithium or sodium hydroxide. Alternatively an acyl group such as a *t*-butoxycarbonyl group may be removed, for example, by treatment with a suitable acid as hydrochloric, sulphuric or phosphoric acid or trifluoroacetic acid and an arylmethoxycarbonyl group such as a benzyloxycarbonyl group may be removed, for example, by hydrogenation over a catalyst such as palladium-on-carbon, or by treatment with a Lewis acid for example boron tris(trifluoroacetate). A suitable alternative protecting group for a primary amino group is, for example, a phthaloyl group which may be removed by treatment with an alkylamine, for example dimethylaminopropylamine, or with hydrazine.

A suitable protecting group for a hydroxy group is, for example, an acyl group, for example an alkanoyl group such as acetyl, an aroyl group, for example benzoyl, or an arylmethyl group, for example benzyl. The deprotection conditions for the above protecting groups will necessarily vary with the choice of protecting group. Thus, for example, an acyl group such as an alkanoyl or an aroyl group may be removed, for example, by hydrolysis with

a suitable base such as an alkali metal hydroxide, for example lithium or sodium hydroxide. Alternatively an arylmethyl group such as a benzyl group may be removed, for example, by hydrogenation over a catalyst such as palladium-on-carbon.

A suitable protecting group for a carboxy group is, for example, an esterifying group, for example a methyl or an ethyl group which may be removed, for example, by hydrolysis with a base such as sodium hydroxide, or for example a *t*-butyl group which may be removed, for example, by treatment with an acid, for example an organic acid such as trifluoroacetic acid, or for example a benzyl group which may be removed, for example, by hydrogenation over a catalyst such as palladium-on-carbon.

The protecting groups may be removed at any convenient stage in the synthesis using conventional techniques well known in the chemical art.

In order to use a compound of the formula **(I)** or formula **(II)** or formula **(III)** or formula **(IV)**, or a pharmaceutically-acceptable salt or *in vivo* cleavable ester thereof, for the therapeutic treatment (including prophylactic treatment) of mammals including humans, it is normally formulated in accordance with standard pharmaceutical practice as a pharmaceutical composition.

Furthermore in order to use a compound of the formula **(I)** or formula **(II)** or formula **(III)** or formula **(IV)**, or a pharmaceutically acceptable salt, prodrug or solvate thereof, for the therapeutic treatment (including prophylactic treatment) of mammals including humans, it is normally formulated in accordance with standard pharmaceutical practice as a pharmaceutical composition.

According to this aspect of the invention there is provided a pharmaceutical composition which comprises a compound of the formula **(I)** or formula **(II)** or formula **(III)** or formula **(IV)** or a pharmaceutically-acceptable or *in vivo* cleavable ester thereof, as defined herein before in association with a pharmaceutically-acceptable diluent or carrier.

According to this aspect of the invention there is provided a pharmaceutical composition which comprises a compound of the formula **(I)** or formula **(II)** or formula **(III)** or formula **(IV)** or a pharmaceutically acceptable salt, prodrug or solvate thereof, as defined herein before in association with a pharmaceutically-acceptable diluent or carrier.

The compositions of the invention may be in a form suitable for oral use (for example as tablets, lozenges, hard or soft capsules, aqueous or oily suspensions, emulsions, dispersible

powders or granules, syrups or elixirs), for topical use (for example as creams, ointments, gels, or aqueous or oily solutions or suspensions), for administration by inhalation (for example as a finely divided powder or a liquid aerosol), for administration by insufflation (for example as a finely divided powder) or for parenteral administration (for example as a sterile aqueous or oily solution for intravenous, subcutaneous, intramuscular or intramuscular dosing or as a suppository for rectal dosing).

The compositions of the invention may be obtained by conventional procedures using conventional pharmaceutical excipients, well known in the art. Thus, compositions intended for oral use may contain, for example, one or more colouring, sweetening, flavouring and/or preservative agents.

Suitable pharmaceutically-acceptable excipients for a tablet formulation include, for example, inert diluents such as lactose, sodium carbonate, calcium phosphate or calcium carbonate, granulating and disintegrating agents such as corn starch or algenic acid; binding agents such as starch; lubricating agents such as magnesium stearate, stearic acid or talc; preservative agents such as ethyl or propyl p-hydroxybenzoate, and anti-oxidants, such as ascorbic acid. Tablet formulations may be uncoated or coated either to modify their disintegration and the subsequent absorption of the active ingredient within the gastrointestinal tract, or to improve their stability and/or appearance, in either case, using conventional coating agents and procedures well known in the art.

Compositions for oral use may be in the form of hard gelatin capsules in which the active ingredient is mixed with an inert solid diluent, for example, calcium carbonate, calcium phosphate or kaolin, or as soft gelatin capsules in which the active ingredient is mixed with water or an oil such as peanut oil, liquid paraffin, or olive oil.

Aqueous suspensions generally contain the active ingredient in finely powdered form together with one or more suspending agents, such as sodium carboxymethylcellulose, methylcellulose, hydroxypropylmethylcellulose, sodium alginate, polyvinyl-pyrrolidone, gum tragacanth and gum acacia; dispersing or wetting agents such as lecithin or condensation products of an alkylene oxide with fatty acids (for example polyoxethylene stearate), or condensation products of ethylene oxide with long chain aliphatic alcohols, for example heptadecaethyleneoxycetanol, or condensation products of ethylene oxide with partial esters derived from fatty acids and a hexitol such as polyoxyethylene sorbitol monooleate, or

condensation products of ethylene oxide with partial esters derived from fatty acids and hexitol anhydrides, for example polyethylene sorbitan monooleate. The aqueous suspensions may also contain one or more preservatives (such as ethyl or propyl p-hydroxybenzoate, anti-oxidants (such as ascorbic acid), colouring agents, flavouring agents, and/or sweetening agents (such as sucrose, saccharine or aspartame).

Oily suspensions may be formulated by suspending the active ingredient in a vegetable oil (such as arachis oil, olive oil, sesame oil or coconut oil) or in a mineral oil (such as liquid paraffin). The oily suspensions may also contain a thickening agent such as beeswax, hard paraffin or cetyl alcohol. Sweetening agents such as those set out above, and flavouring agents may be added to provide a palatable oral preparation. These compositions may be preserved by the addition of an anti-oxidant such as ascorbic acid.

Dispersible powders and granules suitable for preparation of an aqueous suspension by the addition of water generally contain the active ingredient together with a dispersing or wetting agent, suspending agent and one or more preservatives. Suitable dispersing or wetting agents and suspending agents are exemplified by those already mentioned above. Additional excipients such as sweetening, flavouring and colouring agents, may also be present.

The pharmaceutical compositions of the invention may also be in the form of oil-in-water emulsions. The oily phase may be a vegetable oil, such as olive oil or arachis oil, or a mineral oil, such as for example liquid paraffin or a mixture of any of these. Suitable emulsifying agents may be, for example, naturally-occurring gums such as gum acacia or gum tragacanth, naturally-occurring phosphatides such as soya bean, lecithin, an esters or partial esters derived from fatty acids and hexitol anhydrides (for example sorbitan monooleate) and condensation products of the said partial esters with ethylene oxide such as polyoxyethylene sorbitan monooleate. The emulsions may also contain sweetening, flavouring and preservative agents.

Syrups and elixirs may be formulated with sweetening agents such as glycerol, propylene glycol, sorbitol, aspartame or sucrose, and may also contain a demulcent, preservative, flavouring and/or colouring agent.

The pharmaceutical compositions may also be in the form of a sterile injectable aqueous or oily suspension, which may be formulated according to known procedures using one or more of the appropriate dispersing or wetting agents and suspending agents, which

have been mentioned above. A sterile injectable preparation may also be a sterile injectable solution or suspension in a non-toxic parenterally-acceptable diluent or solvent, for example a solution in 1,3-butanediol.

Suppository formulations may be prepared by mixing the active ingredient with a suitable non-irritating excipient which is solid at ordinary temperatures but liquid at the rectal temperature and will therefore melt in the rectum to release the drug. Suitable excipients include, for example, cocoa butter and polyethylene glycols.

Topical formulations, such as creams, ointments, gels and aqueous or oily solutions or suspensions, may generally be obtained by formulating an active ingredient with a conventional, topically acceptable, vehicle or diluent using conventional procedures well known in the art.

Compositions for administration by insufflation may be in the form of a finely divided powder containing particles of average diameter of, for example, 30μm or much less, the powder itself comprising either active ingredient alone or diluted with one or more physiologically acceptable carriers such as lactose. The powder for insufflation is then conveniently retained in a capsule containing, for example, 1 to 50mg of active ingredient for use with a turbo-inhaler device, such as is used for insufflation of the known agent sodium cromoglycate.

Compositions for administration by inhalation may be in the form of a conventional pressurised aerosol arranged to dispense the active ingredient either as an aerosol containing finely divided solid or liquid droplets. Conventional aerosol propellants such as volatile fluorinated hydrocarbons or hydrocarbons may be used and the aerosol device is conveniently arranged to dispense a metered quantity of active ingredient.

For further information on formulation the reader is referred to Chapter 25.2 in Volume 5 of Comprehensive Medicinal Chemistry (Corwin Hansch; Chairman of Editorial Board), Pergamon Press 1990.

The amount of active ingredient that is combined with one or more excipients to produce a single dosage form will necessarily vary depending upon the host treated and the particular route of administration. For example, a formulation intended for oral administration to humans will generally contain, for example, from 0.5 mg to 2 g of active agent compounded with an appropriate and convenient amount of excipients which may vary from

about 5 to about 98 percent by weight of the total composition. Dosage unit forms will generally contain about 1 mg to about 500 mg of an active ingredient. For further information on Routes of Administration and Dosage Regimes the reader is referred to Chapter 25.3 in Volume 5 of Comprehensive Medicinal Chemistry (Corwin Hansch; Chairman of Editorial Board), Pergamon Press 1990.

The size of the dose for therapeutic or prophylactic purposes of a compound of the formula **(I)** will naturally vary according to the nature and severity of the conditions, the age and sex of the animal or patient and the route of administration, according to well known principles of medicine.

In using a compound of the formula (1) for therapeutic or prophylactic purposes it will generally be administered so that a daily dose in the range, for example, 0.5 mg to 75 mg per kg body weight is received, given if required in divided doses. In general lower doses will be administered when a parenteral route is employed. Thus, for example, for intravenous administration, a dose in the range, for example, 0.5 mg to 30 mg per kg body weight will generally be used. Similarly, for administration by inhalation, a dose in the range, for example, 0.5 mg to 25 mg per kg body weight will be used. Oral administration is however preferred, particularly in tablet form. Typically, unit dosage forms will contain about 1 mg to 500 mg of a compound of this invention.

The compounds of this invention may be used in combination with other drugs and therapies used in the treatment of disease states which would benefit from antagonism at the neuropeptide Y5 receptor. For example, the compounds of the formula **(I)** could be used in combination with drugs and therapies used in the treatment of eating disorders, including, but not limited to, obesity or bulimia. Furthermore, the compounds of the formula **(I)** could be used in combination with drugs and therapies used in the treatment of eating disorders, including, but not limited to, obesity and related disorders, anorexia or bulimia.

If formulated as a fixed dose such combination products employ the compounds of this invention within the dosage range described herein and the other pharmaceutically-active agent within its approved dosage range. Sequential use is contemplated when a combination formulation is inappropriate.

Although the compounds of the formula (1) are primarily of value as therapeutic agents for use in warm-blooded animals (including man), they are also useful whenever it is

required to antagonise binding at the neuropeptide Y5 receptor. Thus, they are useful as pharmacological standards for use in the development of new biological tests and in the search for new pharmacological agents.

Biological Assays

The activity of compounds of the invention was measured in a neuropeptide Y5 receptor binding assay as follows. Compounds were also tested in binding assays for the neuropeptide Y_1 and neuropeptide Y_2 receptors. Activity against these 2 receptors is contraindicated for a neuropeptide Y5 antagonist.

a) expression of human neuropeptide Y5 receptor in High 5™ insect cells.

High 5™ insect cells were obtained from Invitrogen (catalogue N° B855-02) and stored in liquid nitrogen. Cells were revived from liquid nitrogen storage and grown at 28°C in 100 ml ExCell 405 (JRH Biosciences) serum free medium in a 250 ml conical flask (Corning) agitated at 140 rpm in an Innova 4330 orbital shaker (New Brunswick Scientific). Cultures were routinely sub-cultured every 3 - 4 days.

High 5™ insect cells were transfected with the human NPY5 receptor as follows: PCR primers were designed against huNPY5 receptor sequence, Genbank Accession Number U56079 [Gerald et. al (1996) Nature 382, 168-171], but starting at base 56 through to base 1393, to express the protein 10 amino acid residues shorter at the amino terminal end [see Borowsky et al (1998) Regulatory Peptides 75-76, 45-53]. These primers were used to amplify the huNPY5 receptor from human placenta genomic DNA by PCR. This was then sub-cloned into pZERO2 (obtained from Invitrogen) for sequencing and re-cloned into pFASTBAC1(obtained from GIBCO BRL Life Technologies) for expression. Human NPYr was isolated from pZERO2 on BamHI fragment and sub-cloned into pFastbac1 on BamHI restriction site. The junctions were sequenced to ensure correct prior to expression.

A baculovirus containing the pFASTBAC1 was then generated using the Bac-to-Bac™ baculovirus expression system [Anderson et al (1996) FASEB Journal 10(6), 727-726] (obtained from GIBCO BRL Life Technologies) following the protocol supplied with this expression system by GIBCO BRL Life Technologies.

High 5™ insect cells were infected with the baculovirus to transfect the cells with the human neuropeptide Y5 receptor as follows: Batches were grown for membrane preparation by inoculating 5 L of ExCell 405™ medium in a 7 L Bioreactor (FT-Applikon) with 1.75 x

10^9 mid log High 5™ cells. After 2-3 days growth at 28°C the mid log culture was infected with Baculovirus expressing the human NPY5 receptor at a multiplicity of infection (MOI) of 1.0. Cells (typically $1x10^{10}$) were harvested 48 hours post infection by centrifugation (Heraeus Omnifuge 2.0RS 30 min, 296g , 4°C) and flash frozen in liquid nitrogen for storage at -80°C.

b) Membrane preparation procedure

The following buffer was prepared daily and stored at 4°C. 50mM Tris HCl pH 7.4, 5mM EDTA and 10% w.v. sucrose. A protease inhibitor cocktail (Boehringer Mannheim) was added to both buffers according to the manufacturers instruction. Cells were thawed rapidly in three times their packed cell volume of hypotonic buffer (3:1 mix of water and buffer) and lysed routinely on ice using five Vibra Cell Sonicator (Sonics and Materials Inc.) bursts of ten seconds for the High 5™ insect cells. The cell lysate (typically 10-15 ml) was carefully loaded onto a 10 ml 41% sucrose cushion which was topped off with lysis buffer and spun at 150,000g for 1 hour at 4°C in a Beckman Optima LE-80K Ultracentrifuge. The membrane fraction was carefully removed from the inter-phase and diluted at least four fold with lysis buffer. The membrane pellets were recovered by centrifugation at 150,000g for 20 min at 4°C in a Beckman Optima LE-80K Ultracentrifuge and re-suspended at $5x10^7$ cell equivalents per ml. The re-suspended membranes were divided into working aliquots, routinely 1ml, flash frozen in liquid nitrogen and stored frozen at -80°C until use.

Prior to use the 1ml High 5™ membranes were thawed and resuspended in 8ml binding buffer (see below). Membranes are used at approximately 7μg/ml of protein per incubate.

c) neuropeptide Y5 receptor binding assay

The following reagents were used:

Binding buffer: 50mM HEPES, 2.5mM $CaCl_2$, 1mM $MgCl_2$, 0.5% BSA, pH=7.4

Binding wash buffer: 50mM HEPES, 2.5mM $CaCl_2$, 1mM $MgCl_2$, 0.5M NaCl, 0.5% BSA, pH=7.4

Unifilter GFC filter plates: 50μl of 0.5% polyethyleneimine was added to each well and left to equilibrate for four hours before use

Incubation plates: 96 well polypropylene plates, siliconised prior to use

Test Compounds: Compounds were dissolved in DMSO at a concentration of 1mM. Final concentration of DMSO in the assay did not exceed 1%.

Peptide PYY (pancreatic polypeptide Y) - 10μM stock solution in binding buffer.

^{125}I PYY - 10μCi/ml stock solution, diluted 1:10 dilution, into binding buffer.

Assays were performed in 96 well microtitre plates. 10μl of diluted test compound was added to each well of a plate, followed by 80μl of membranes and 10μl of radiolabelled ^{125}I PYY (0.01μCi per well). Total and non-specific binding controls were included in each plate. The non-specific binding wells received 10μl of Peptide PYY from the 10μM stock solution, whilst the total binding wells received 10μl of binding buffer. For each assay, a duplicate dose response of peptide PYY was included, top concentration 1μM.

The plates were incubated for two hours at room temperature with mixing, and then filtered onto the pre-treated filter plates. The incubation plates were washed twice with 150μl of cold binding wash buffer per well, then the filter plates were further washed with approximately 2.5ml per well. The filter plates were dried overnight at room temperature, the bottoms were sealed, and 20μl of Scintillant (Microscint 40, Canberra Packard) was added to each well. The tops of the plates were sealed and the plates were counted for 1 minute on a protocol set up for ^{125}I on a 96 well plate liquid scintillation counter (Top Count, Canberra Packard).

Compounds were considered to be active if they inhibited the binding by more than 50% at a concentration of 10μM. Dose responses were carried out on all compounds found to be active (8 point curves in duplicate).

Although the pharmacological properties of the compounds of the formula **(I)** vary with structural change as expected, in general compounds of the formula **(I)** possess an IC_{50} in the above test in the range, for example, 0.0002 to 200μM. For example *N*-(9-ethyl-9H-carbazol-3-yl)-(4-methylphenoxy)-acetamide has an IC_{50} for the Neuropeptide Y5 receptor of 86nM.

Examples

The invention will now be illustrated by the following non-limiting Examples in which, unless otherwise stated:

(i) concentrations and evaporations were carried out by rotary evaporation *in vacuo*;

(ii) operations were carried out at room temperature, that is in the range 18-26°C;

(iii) yields, when given, are intended for the assistance of the reader only and are not necessarily the maximum attainable by diligent process development;

(iv) the following abbreviations are used:

DMAP	4-dimethyaminopyridine;
DMA	dimethylacetamide
EDAC	1-[3-(dimethylamino)propyl]-3-ethylcarbodiimide;
DMF	*N,N*-dimethylformamide;
THF	tetrahydrofuran;
DMSO	dimethylsulphoxide;
MeOH	methanol;
EtOH	ethanol
DCM	dichloromethane;
ether	diethylether;
EtOAc	ethyl acetate; and
RT	retention time;

v) all procedures were carried out at room temperature unless otherwise stated;

vi) all commercially available reagents and solvents were used without further purification unless otherwise stated;

vii) Organic solvent extracts were dried over anhydrous magnesium sulphate unless otherwise stated;

viii) ^1H and ^{13}C NMR were recorded on Bruker DPX-300, DPX-400 or Varian Gemini 2000 instruments using $CDCl_3$ or DMSO-d_6 with Me_4Si as internal reference and ^1H NMR is quoted at 300 MHz using DMSO-d_6 as a solvent unless otherwise stated; chemical shifts are in δ (ppm) and peak multiplicities are designated as follows: s, singlet; d, doublet; dd, doublet of doublets; t, triplet; dt, doublet of triplets; q, quartet; m, multiplet; br, broad; sept, septuplet;

ix) mass spectra were recorded on Micromass Platform positive and negative electrospray spectrometers; m/z values are quoted and unless otherwise stated the positive electrospray is quoted - $(MH)^+$;

x) for TLC analysis, Merck precoated TLC plates (silica gel 60 F254, d = 0.25 mm) were used;

xi) flash chromatography was performed on silica (Merck Keiselgel: Art.9385) unless otherwise stated; where a "Bond Elut" column is referred to, this means a column containing 10 g or 20 g of silica of 40 micron particle size, the silica being contained in a 60 ml

disposable syringe and supported by a porous disc, obtained from Varian, Harbor City, California, USA under the name "Mega Bond Elut SI"; where an ISOLUTE column is referred to, this means an "ion exchange" extraction cartridge for adsorption of basic or acid material, i.e. a polypropylene tube containing a special grade of ion exchange sorbent, high purity, surface to pH ~7, incorporating a phase-separation filtering material, used according to the manufacturers instructions, obtained from Varian, Harbor City, California, USA under the name of "Extube, Chem Elut, ISOLUTE"; "Extube" is a registered trademark of International Sorbent Technology Limited;

xii) The following Solvent Systems (v/v/v) were used:

Z1 EtOAc;

Z2 10% MeOH, 89% DCM, 1% ammonia;

Z3 stepped gradient eluting initially with 20% isohexane, 80% EtOAc, through 100% EtOAc to 20% MeOH, 80% EtOAc;

Z4 DCM;

Z5 2% MeOH, 98% DCM;

Z6 20% MeOH, 80% DCM;

Z7 2% NH_4OH, 18% MeOH, 80% DCM;

Z8 5% NH_4OH, 15% MeOH, 80% DCM;

Z9 20% EtOAc, 80% isohexane;

Z10 10% MeOH, 90% EtOAc;

Z11 50% isohexane, 50% EtOAc;

Z12 10% EtOAc, 90% isohexane;

xiii) HPLC Method A refers to the following system:

Column:	2.1mm x 3cm Waters Symmetry C18 3.5µm
Solvent:	A = 95 Water, 5 MeOH + 0.1% Formic acid,
	B = 95 Acetonitrile, 5 MeOH + 0.1% Formic acid
Run time:	5 minutes with a 4.5 minute gradient from 0 -100% B
Wavelength:	254nm, bandwidth 10nm
Injection	2 µl

Gradient:

Time	% B	Flow Rate (ml/min)
0.00	0	1.4
3.00	60	1.4
4.00	100	1.4
4.50	100	1.4
4.51	0	1.4

xiv) commercial companies referred to are as follows:

Salor	Sigma Aldrich, Gillingham, Dorset, United Kingdom
Chembridge	Chembridge Corporation, San Diego, USA
Specs	Specs, Rijswijk, Netherlands
Fanwood	Fanwood, New Jersey, USA
Maybridge	Maybridge Chemical Company Ltd., Cornwall, United Kingdom
Aldrich	Sigma Aldrich, Gillingham, Dorset, United Kingdom; and

xv) starting materials for reactions are commercially available unless otherwise indicated.

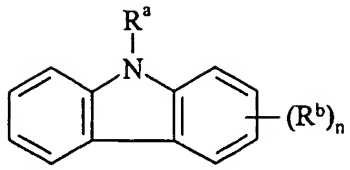
Example 1

2-Amino-9-ethylcarbazole dihydrochloride

2-Nitro-9-ethylcarbazole (Method 12; 2.00 g, 8.30 mM) in EtOAc (10 ml) and EtOH (20 ml) was hydrogenated over 10% palladium on carbon at ambient temperature under atmospheric pressure of hydrogen. The catalyst was filtered off through diatomaceous earth and the filtrate concentrated. The residue was redissolved in DCM and HCl in ether (1 M) added. Filtration gave the title product as an off-white solid. Yield 1.64 g (94%). Rf (Z1) 0.55; NMR 8.26 (d, 1H), 8.18 (d, 1H), 7.66 (d, 1H), 7.58 (s, 1H), 7.50 (dd, 1H), 7.25 (d, 1H), 7.21 (d, 1H), 4.40 (q, 2H), 1.32 (t, 3H); m/z 211.4.

Examples 2-10

The following compounds were prepared by the procedure of Example 1 using the appropriate starting materials.



Ex	R^a	$(R^b)_n$	NMR	M/z	SM
2 [1]	$MeSO_2$-	3-NH_2	7.98 (t, 2H), 7.70 (d, 2H), 7.49 (t, 1H), 7.39 (t, 1H), 7.22 (s, 1H), 5.18 (s, 2H), 3.08 (s, 3H)	261.4	Meth 16
3	$CH_3C(O)$-	3-NH_2	8.20 (d, 1H), 7.93 (t, 2H), 7.44 (t, 1H), 7.32 (t, 1H), 7.20 (s, 1H), 6.77 (d, 1H), 5.12 (s, 2H), 2.79 (s, 3H)		Meth 17
4	Me_2NSO_2-	3-NH_2	7.95 (d, 2H), 7.70 (d, 1H), 7.45 (t, 1H), 7.33 (t, 1H), 7.21 (s, 1H), 6.80 (d, 1H), 5.10 (s, 2H), 2.70 (s, 6H)	290.4	Meth 18
5	Et	1-NH_2	1.23 (t, 3H), 4.60 (q, 2H), 4.93 (s, 2H), 6.77 (d, 1H), 7.11 (t, 1H), 7.38 (t, 1H), 7.44 (d, 1H), 7.52 (d, 1H), 7.99 (d, 1H)	239	[2]
6	*n*-Pr	3-NH_2		224.9	Meth 13
7	CF_3CH_2-	3-NH_2	7.91 (d, 1H), 7.55 (d, 1H), 7.36 (m, 2H), 7.12 (t, 1H), 6.81 (d, 1H), 5.23 (q, 2H), 4.80 (brs, 2H)	225.40	Meth 26
8	*i*-Pr	3-NH_2	7.86 (d, 1H), 7.53 (d, 1H), 7.38 (d, 1H), 7.30 (t, 1H), 7.28 (d, 1H), 7.05 (t, 1H), 6.79 (dd, 1H), 4.95 (sept, 1H), 4.70 (s, 2H), 1.58 (d, 6H)	239.33	Meth 14
9	*i*-Pr	2-Me, 3-NH_2	7.86 (d, 1H), 7.49 (d, 1H), 7.30 (2 x s, 2H), 7.26 (t, 1H), 7.03 (t, 1H), 4.93 (sept, 1H), 4.45 (s, 2H), 2.26 (s, 3H), 1.57 (d, 6H)	239.33	Meth 27

10[3]	Et	6-$HOCH_2$-3-NH_2	($CDCl_3$) 8.0 (s, 1H), 7.45-7.4 (m, 2H), 7.3 (d, 1H), 7.2 (d, 1H), 6.9 (dd, 1H), 4.8 (s, 2H), 4.3 (q, 2H), 1.4 (t, 3H)	241	Meth 20

[1] MeOH and palladium on carbon 5% were used instead of EtOH and palladium on carbon 10%. Filtration from celite the only purification.

[2] Starting Material described in Synth Comm, 1994, 24, 1-10.

[3] Product purified by flash chromatography (5% EtOH/DCM)

Example 11

3-Amino-6-cyano-9-ethylcarbazole

6-Cyano-3-nitro-9-N-ethyl carbazole (Method 35; 780 mg) was refluxed with tin (II) chloride dihydrate (4.6 g) in EtOH (6 ml) for 2 hours . After cooling to ambient temperature, water (50 ml) was added, the mixture was basifed with 2M sodium hydroxide and extracted with DCM (3 x 30 ml). The combined organic extracts were washed with brine (2 x 10 ml), dried and evaporated under reduced pressure to give the title compound (403g). NMR ($CDCl_3$) 1.4 (t, 3H), 4.3 (q, 2H), 7.0 (s, 1H), 7.2 (d, 1H), 7.4 (m, 2H), 7.6 (d, 1H), 8.3 (s, 1H): m/z 236.

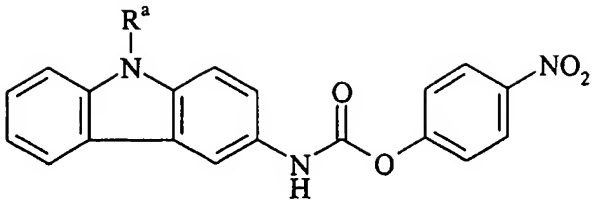
Example 12

3-(4-Nitrophenoxycarbonylamino)-9-ethylcarbazole dihydrochloride

To a solution of *p*-nitrophenyl chloroformate (9.62 g, 48 mmol) in EtOAc (100 ml) was added potassium carbonate (6.57 g, 48 mmol). To this was added 3-amino-9-ethylcarbazole (Example 1; 10.00 g, 48 mmol) dropwise in EtOAc (100 ml). After the addition was complete the reaction was stirred for 1h before washing with water, brine and then dried. The solution was then dry loaded onto silica and chromatographed with DCM / isohexane. A yellow solid was isolated 12.85 g (72%). NMR 1.30 (t, 3H), 4.40 (q, 2H), 6.93 (d, 2H), 7.17 (t, 1H), 7.50 (m, 4H), 8.10 (t, 3H), 8.32 (s, 1H), 8.60 (s, 1H).

Example 13-14

The following compounds were prepared by the procedure of Example 12 using the appropriate starting materials.



Ex	R^a	NMR	SM
13	$MeSO_2$-	10.65 (s, 1H), 8.35 (m, 2H), 8.30 (s, 1H), 8.13 (d, 1H), 8.02 (t, 2H), 7.58 (m, 4H), 7.45 (t, 1H), 3.29 (s, 3H)	Ex 2
14	Me_2NSO_2-	10.59 (s, 1H), 8.31 (m, 3H), 8.11 (d, 1H), 8.04 (m, 2H), 7.55 (4, 2H), 7.42 (t, 1H), 2.77 (s, 6H)	Ex 4

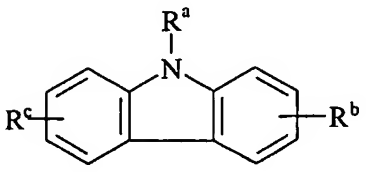
Example 15

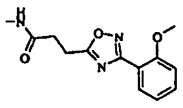
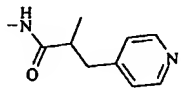
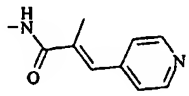
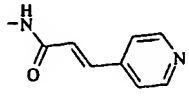
3-(3-Pyrid-4-ylpropionamido)-9-ethylcarbazole

To a solution of 3-pyridin-4-ylpropanoic acid (Method 3; 20 g, 132 mmol), DMAP (27 g, 220 mmol) and EDAC (42 g, 220 mmol) in DMF (100 ml) at room temperature was added 3-amino-9-ethylcarbazole (Ref Ex 15; 23 g, 110 mmol). After 18 hours the reaction was concentrated and water (300 ml) was added followed by MeOH (30 ml). The resulting precipitate was recrystallized from EtOAc (100 ml) to give a white solid. Yield 15.4 g (42%). Rf (Z1) 0.13; NMR 9.96 (s, 1H), 8.47 (d, 2H), 8.38 (s, 1H), 8.04 (d, 1H), 7.50 (m, 3H), 7.44 (t, 1H), 7.30 (d, 2H), 7.18 (t, 1H), 4.40 (q, 2H), 2.98 (t, 2H), 2.70 (t, 2H), 1.30 (t, 3H); MS (ES+) 344.4 [MH^+].

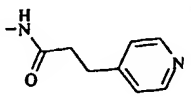
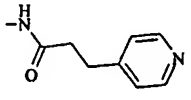
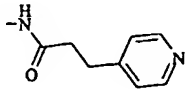
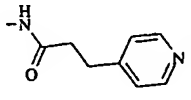
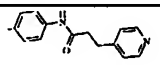
Examples 16-128

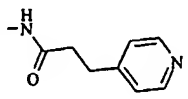
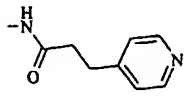
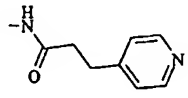
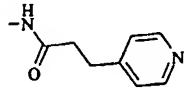
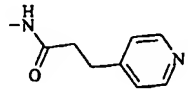
The following compounds were prepared by the procedure of Example 15 using the appropriate starting materials.

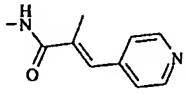
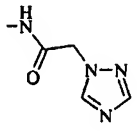
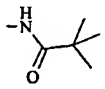


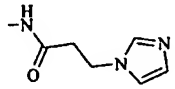
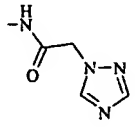
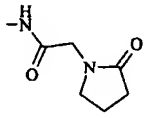
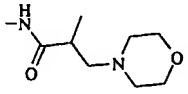
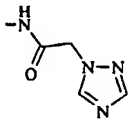
Ex	R^a	R^b	R^c	NMR	M/z	SM
16	Et	3- 	H	10.09 (s, 1H), 8.38 (s, 1H), 8.02 (d, 1H), 7.80 (d, 1H), 7.52 (m, 4H), 7.42 (t, 1H), 7.16 (m, 2H), 7.06 (t, 1H), 4.39 (q, 2H), 3.82 (s, 3H), 3.30 (t, 2H), 2.96 (t, 2H), 1.38 (t, 2H)	441.3	Ref Ex 15 and Meth 10
17 [1]	Et	3- 	H	9.89 (s, 1H), 8.45 (d, 2H), 8.35 (s, 1H), 8.05 (d, 1H), 7.38 (m, 4H), 7.28 (d, 2H), 7.16 (t, 1H), 4.40 (q, 2H), 2.95 (m, 2H), 2.82 (m, 2H), 2.62 (m, 1H), 1.27 (t, 3H), 1.18 (d, 3H)	358.4	Ref Ex 15 and Meth 7
18 [1,2]	Et	3- 	H	10.08 (s, 1H), 8.64 (d, 2H), 8.47 (s, 1H), 8.06 (d, 1H), 7.68 (m, 1H), 7.55 (m, 2H), 7.39 (m, 3H), 7.29 (s, 1H), 7.18 (t, 1H), 4.41 (q, 2H), 2.16 (s, 3H), 1.31 (t, 3H)	356.4	Ref Ex 15 and Meth 5
19 [1,2]	Et	3- 	H	10.36 (s, 1H), 8.62 (d, 2H), 8.53 (s, 1H), 8.08 (d, 1H), 7.68 (m, 1H), 7.52 (m, 5H), 7.42 (t, 1H), 7.18 (t, 1H), 7.09 (d, 1H), 4.41 (q, 2H), 1.33 (t, 3H)	341.9	Ref Ex 15 and Meth 8

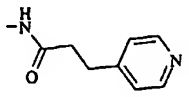
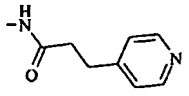
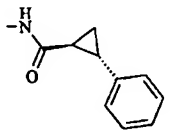
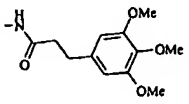
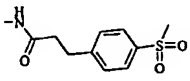
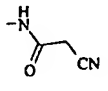
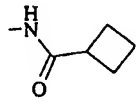
5

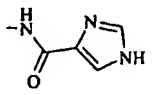
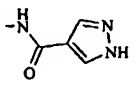
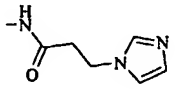
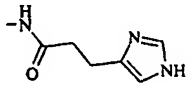
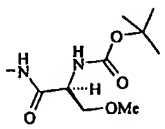
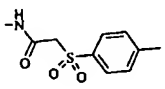
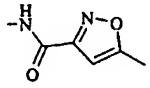
20[1]	H	3- 	H	11.05 (s, 1H), 9.89 (s, 1H), 8.46 (d, 2H), 8.32 (s, 1H), 7.99 (d, 1H), 7.45 (m, 2H), 7.28 (m, 2H), 7.11 (t, 1H), 2.95 (t, 2H), 2.65 (t, 2H)	316.2	Meth 3
21[1]	Me	3- 	H	9.95 (s, 1H), 8.45 (d, 2H), 8.35 (s, 1H), 8.05 (d, 1H), 7.50 (m, 4H), 7.40 (d, 2H), 7.15 (t, 1H), 3.85 (s, 3H), 2.93 (t, 2H), 2.60 (t, 2H)	330.4	[3] and Meth 3
22	PhC(O)-	3- 	H	10.16 (s, 1H), 8.46 (m, 3H), 8.08 (m, 1H), 7.71 (m, 3H), 7.60 (m, 2H), 7.35 (m, 7H), 2.98 (t, 2H), 2.74 (t, 2H)	420.1	[4] and Meth 3
23	Et	2- 	H	8.48 (d, 2H), 8.17 (d, 1H), 8.01 (d, 1H), 7.93 (d, 1H), 7.88 (brs , 1H), 7.41 (m, 2H), 7.18 (m, 1H), 7.15 (d, 2H), 7.00 (dd, 1H), 4.30 (q, 2H), 3.08 (t, 2H), 2.70 (t, 2H), 1.40 (t, 3H)	344.4	Ex 1 and Meth 3
24[5]		H	H	10.25 (s, 1H), 8.48 (d, 2H), 8.24 (d, 2H), 7.88 (d, 2H), 7.51 (d, 2H), 7.30 (m, 4H), 2.95 (t, 2H), 2.70 (t, 2H)	392.1	Meth 3
25	Et	3-t-BuOC(O)NH-CH_2C(O)NH-	H	1.28 (t, 3H), 1.40 (s, 9H), 3.78 (d, 2H), 4.42 (q, 2H), 7.05 (brt, 1H), 7.16 (t, 1H), 7.43 (t, 1H), 7.67 (d, 3H), 8.05 (d, 1H), 8.41 (s, 1H), 9.93 (s, 1H)	368	Ref Ex 15

26	Et	1- 	H	1.09 (t, 3H), 2.79 (t, 2H), 2.97 (t, 2H), 4.36 (q, 2H), 7.03-7.22 (m, 3H), 7.34 (d, 2H), 7.44 (t, 1H), 7.55 (d, 1H), 8.05 (d, 1H), 8.13 (d, 1H), 8.50 (d, 2H), 9.90 (s, 1H)	344	Ex 5 and Meth 3
27	n-Pr	3- 	H	0.84 (t, 3H), 1.78 (m, 2H), 2.70 (t, 2H), 2.96 (t, 2H), 4.32 (t, 2H), 7.15 (t, 1H), 7.28 (d, 2H), 7.42 (t, 1H), 7.54 (m, 4H), 8.03 (d, 1H), 8.35 (s, 1H), 8.46 (d, 2H), 9.90 (s, 1H)	358.1	[6] and Meth 3
28	MeC(O)-	3- 	H	2.72 (t, 2H), 2.87 (s, 3H), 2.96 (t, 2H), 7.31 (d, 2H), 7.40 (t, 1H), 7.53 (m, 2H), 8.06 (d, 1H), 8.18 (d, 1H), 8.24 (d, 1H), 8.44 (m, 3H), 10.18 (s, 1H)	358.3	Ex 3 and Meth 3
29	Me_2NSO_2-	3- 	H	2.74 (m, 8H), 2.96 (t, 2H), 7.28 (d, 2H), 7.40 (t, 1H), 7.53 (m, 2H), 8.03 (m, 3H), 8.44 (m, 3H), 10.16 (s, 1H)	423.4	Ex 4 and Meth 3
30	$MeSO_2$-	3- 	H	2.72 (t, 2H), 2.94 (m, 2H), 3.24 (s, 3H), 7.30 (d, 2H), 7.43 (t, 1H), 7.55 (m, 2H), 7.93 (d, 1H), 8.02 (d, 1H), 8.10 (d, 1H), 8.45 (m, 3H), 10.19 (s, 1H)	393.5	Ex 2 and Meth 3

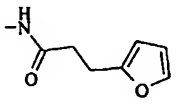
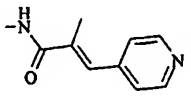
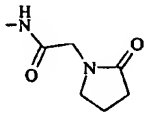
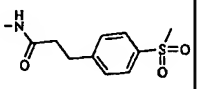
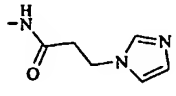
31	MeC(O)-	3- 	H	1.15 (d, 6H), 2.63 (m, 1H), 2.89 (s, 3H), 7.40 (t, 1H), 7.50 (s, 1H), 7.60 (t, 1H), 8.04 (d, 1H), 8.17 (d, 1H), 8.25 (d, 1H), 8.46 (s, 1H), 10.03 (s, 1H)	293.0 $(M-H)^-$	Ex 3
32	$MeSO_2$-	3- 	H	1.14 (d, 6H), 2.63 (m, 1H), 3.24 (s, 3H), 7.45 (t, 1H), 7.56 (t, 1H), 7.62 (d, 1H), 7.95 (d, 1H), 8.02 (d, 1H), 8.11 (d, 1H), 8.51 (s, 1H), 10.06 (s, 1H)	330.73	Ex 2
33 [2]	$MeSO_2$-	3- 	H	2.18 (s, 3H), 3.27 (s, 3H), 7.30 (s, 1H), 7.46 (m, 3H), 7.57 (t, 1H), 7.80 (d, 1H), 8.04 (m, 2H), 8.13 (d, 1H), 8.58 (s, 1H), 8.66 (s, 2H), 10.23 (s, 1H)	403.7	Ex 2 and Meth 5
34	$MeSO_2$-	3- 	H	3.28 (s, 3H), 5.17 (s, 2H), 7.45 (t, 1H), 7.55 (m, 2H), 7.98 (m, 3H), 8.10 (d, 1H), 8.46 (s, 1H), 8.55 (s, 1H), 10.62 (s, 1H)	368.5	Ex 2
35	$MeSO_2$-	3- 	H	1.26 (s, 9H), 3.24 (s, 3H), 7.43 (t, 1H), 7.54 (t, 1H), 7.70 (d, 1H), 7.93 (d, 1H), 8.02 (d, 1H), 8.10 (d, 1H), 8.48 (s, 1H), 9.42 (s, 1H)	344.8	Ex 2

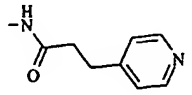
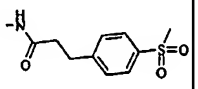
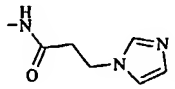
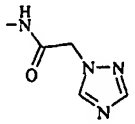
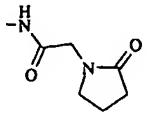
36	$MeSO_2$-	3- 	H	2.86 (t, 2H), 3.23 (s, 3H), 4.32 (t, 2H), 6.86 (s, 1H), 7.16 (s, 1H), 7.45 (t, 1H), 7.57 (m, 2H), 7.63 (s, 1H), 7.94 (d, 1H), 8.03 (d, 1H), 8.12 (d, 1H), 8.45 (s, 1H) 10.21 (s, 1H)	383.3	Ex 2 and [7]
37	Et	3- 	H	10.4 (s, 1H), 8.55 (s, 1H), 8.4 (s, 1H), 8. (d, 1H), 8.0 (s, 1H), 7.6-7.5 (m, 3H), 7.4 (t, 1H), 7.15 (t, 1H), 5.15 (s, 2H), 4.4 (q, 2H), 1.3 (t, 3H)	320	Ref Ex 15
38	Et	3- 	H	10.0 (s, 1H), 8.4 (s, 1H), 8.05 (d, 1H), 7.56-7.45 (m, 3H), 7.4 (t, 1H), 7.15 (t, 1H), 4.4 (q, 2H), 4.05 (s, 2H), 3.5 (t, 2H), 2.3 (t, 2H), 2.0 (m, 2H), 1.3 (t, 3H)	336	Ref Ex 15 and Meth 25
39	Et	3- 	H	10.0 (s, 1H), 8.4 (s, 1H), 8.05 (d, 1H), 7.6-7.45 (m, 3H), 7.4 (t, 1H), 7.15 (t, 1H), 4.4 (q, 2H), 3.6 (m, 4H), 2.85-2.7 (m, 1H), 2.7-2.6 (m, 1H), 2.4-2.3 (m, 2H), 2.3-2.2 (m, 1H). 1.3 (t, 3H), 1.1 (d, 3H)	366	Ref Ex 15 and Meth 24
40	MeC(O)-	3- 	H	2.86 (s, 3H), 5.20 (s, 2H), 7.41 (t, 1H), 7.57 (m, 2H), 8.00 (s, 1H), 8.08 (d, 1H), 8.24 (m, 2H), 8.45 (s, 1H), 8.50 (s, 1H), 10.65 (s, 1H)	332.4 $(M-H)^-$	Ex 3

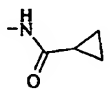
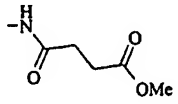
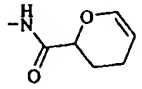
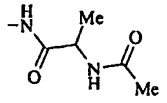
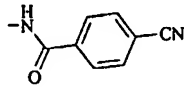
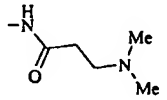
41	Et	3- 	6-Cl	($CDCl_3$) 8.5 (d, 2H), 8.15 (d, 1H). 7.95 (d, 1H), 7.5 (brs, 1H), 7.45 (dd, 1H), 7.4 (dd, 1H), 7.3-7.25 (m, 2H), 7.2 (d, 2H), 4.3 (q, 2H), 3.1 (t, 2H), 2.7 (t, 2H), 1.4 (t, 3H)	378	[8] and Meth 3
42	Et	3- 	6-HO-CH_2-	9.9 (s, 1H), 8.5-8.4 (m, 2H), 7.95 (s, 1H), 7.5-7.45 (m, 3H), 7.4 (dd, 1H), 7.3 (d, 2H), 5.1 (t, 1H), 4.6 (d, 2H), 4.4 (q, 2H), 2.95 (t, 2H), 2.7 (t, 2H), 1.3 (t, 3H)	374	Ex 10 and Meth 3
43	Et	3- 	H	RT 3.77 min HPLC Method A	355	Ref Ex 15
44	Et	3- 	H	RT 3.36 min HPLC Method A	433	Ref Ex 15
45	Et	3- 	H	RT 3.17 min HPLC Method A	421	Ref Ex 15
46	Et	3- 	H	RT 2.95 min HPLC Method A	278	Ref Ex 15
47	Et	3- 	H	RT 3.28 min HPLC Method A	293	Ref Ex 15

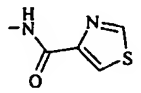
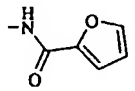
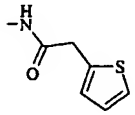
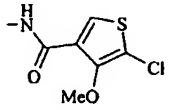
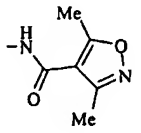
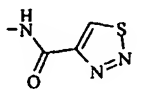
48	Et	3- 	H	RT 2.37 min HPLC Method A	305	Ref Ex 15
49	Et	3- 	H	RT 2.72 min HPLC Method A	305	Ref Ex 15
50	Et	3- 	H	RT 1.93 min HPLC Method A	333	Ref Ex 15 and [7]
51	Et	3- 	H	RT 2.00 min HPLC Method A	373	Ref Ex 15
52	Et	3- 	H	RT 3.27 min HPLC Method A	412	Ref Ex 15
53	Et	3- 	H	RT 3.24 min HPLC Method A	407	Ref Ex 15
54	Et	3- 	H	10.58 (s, 1H), 8.55 (s, 1H), 8.08 (d, 1H), 7.75 (d, 1H), 7.59 (d, 2H), 7.46 (t, 1H), 7.18 (t, 1H), 6.66 (s, 1H), 4.44 (q, 2H), 2.47 (s, 3H), 1.29 (t, 3H)	320.6	Ref Ex 15

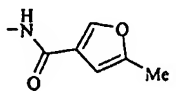
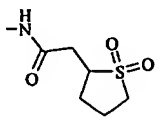
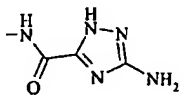
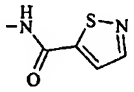
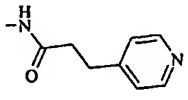
5

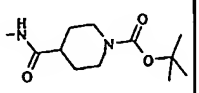
55	Et	3- 	H	10.00 (s, 1H), 8.40 (s, 1H), 8.05 (d, 1H), 7.54 (m, 4H), 7.42 (t, 1H), 7.16 (t, 1H), 6.35 (s, 1H), 6.15 (s, 1H), 4.40 (q, 2H), 2.96 (t, 2H), 2.69 (t, 2H), 1.25 (t, 3H)	333.3	Ref Ex 15
56 [2]	$CH_3C(O)$-	3- 	H	10.26 (s, 1H), 8.63 (d, 2H), 8.55 (s, 1H), 8.24 (t, 2H), 8.08 (d, 1H), 7.76 (d, 1H), 7.52 (t, 1H), 7.44 (m, 3H), 7.30 (s, 1H), 2.89 (s, 3H), 2.18 (s, 3H)	368.4 $(M-H)^-$	Ex 3 and Meth 5
57	Me_2NSO_2-	3- 	H	10.23 (s, 1H), 8.46 (s, 1H), 8.02 (m, 3H), 7.53 (m, 2H), 7.39 (t, 1H), 4.07 (s, 2H), 3.45 (t, 2H), 3.30 (s, 6H), 2.27 (t, 2H), 2.00 (t, 2H)	415.3	Ex 4 and Meth 25
58	Me_2NSO_2-	3- 	H	10.13 (s, 1H), 8.43 (s, 1H), 8.09 (d, 1H), 8.03 (d, 1H), 7.95 (d, 1H), 7.83 (d, 2H), 7.55 (m, 4H), 7.40 (t, 1H), 3.17 (s, 3H), 3.06 (t, 2H), 2.72 (m, 8H)	500.4	Ex 4
59	Me_2NSO_2-	3- 	H	10.16 (s, 1H), 8.44 (s, 1H), 8.10 (d, 1H), 8.04 (d, 1H), 7.97 (d, 1H), 7.62 (s, 1H), 7.54 (m, 2H), 7.40 (t, 1H), 7.16 (s, 1H), 6.87 (s, 1H), 4.31 (t, 2H), 2.85 (t, 2H), 2.73 (s, 6H)	412.5	Ex 4 and [7]

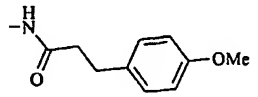
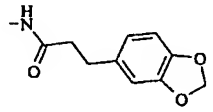
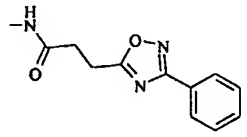
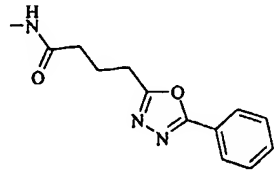
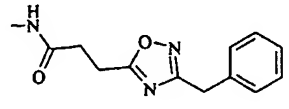
60	CF_3CH_2-	3- 	H	10.03 (s, 1H), 8.48 (d, 2H), 8.40 (s, 1H), 8.06 (d, 1H), 7.65 (m, 2H), 7.53 (m, 1H), 7.48 (t, 1H), 7.30 (d, 2H), 5.36 (q, 2H), 2.98 (t, 2H), 2.71 (t, 2H)	398.5	Ex 7 and Meth 3
61	CF_3CH_2-	3- 	H	10.01 (s, 1H), 8.40 (s, 1H), 8.04 (d, 1H), 7..85 (d, 2H), 7.68 (m, 2H), 7.55 (m, 3H), 7.46 (t, 1H), 7.23 (t, 1H), 5.36 (q, 2H), 3.18 (s, 3H), 3.05 (t, 2H), 2.70 (t, 2H)	475.4	Ex 7
62	CF_3CH_2-	3- 	H	10.50 (s, 1H), 8.38 (s, 1H), 8.06 (d, 1H), 7..58 (m, 3H), 7.50 (m, 2H), 7.25 (t, 1H), 7.19 (s, 1H), 6.85 (s, 1H), 5.37 (q, 2H), 4.33 (t, 2H), 2.83 (t, 2H)	387.5	Ex 7 and [5]
63	CF_3CH_2-	3- 	H	10.54 (s, 1H), 8.63 (s, 1H), 8.46 (s, 1H), 8.14 (d, 1H), 8.06 (s, 1H), 7.75 (m, 2H), 7.63 (m, 1H), 7.52 (t, 1H), 7.30 (t, 1H), 5.45 (q, 2H), 5.22 (s, 2H)	374.5	Ex 7
64	CF_3CH_2-	3- 	H	10.11 (s, 1H), 8.41 (s, 1H), 8.07 (d, 1H), 7.66 (t, 2H), 7.54 (m, 1H), 7.45 (t, 1H), 7.22 (t, 1H), 5.36 (q, 2H), 4.03 (s, 2H), 3.46 (t, 2H), 2.27 (t, 2H), 1.98 (t, 2H)	390.5	Ex 7 and Meth 25

65	Et	3- 	H	10.15 (s, 1H), 8.37 (s, 1H), 8.01 (d, 1H), 7.51 (m, 3H), 7.37 (t, 1H), 7.12 (t, 1H), 4.37 (q, 2H), 1.79 (m, 1H), 1.27 (t, 3H), 0.76 (m, 4H)	279	Ref Ex 15
66	Et	3- 	H	9.9 (s, 1H), 8.4 (s, 1H), 8.0 (d, 1H), 7.5 (m, 3H), 7.4 (t, 1H), 7.15 (t, 1H), 4.4 (q, 2H), 3.6 (s, 3H), 2.6 (s, 4H), 1.15 (t, 3H)	325	Ref Ex 15
67	Et	3- 	H	9.7 (s, 1H), 8.4 (d, 1H), 8.0 (d, 1H), 7.6 (dd, 1H), 7.55 (at, 2H), 7.4 (t, 1H), 7.2 (t, 1H), 6.5 (d, 1H), 4.8 (m, 1H), 4.4 (m, 3H), 2.2-1.8 (m, 4H), 1.3 (t, 3H)	321	Ref Ex 15
68	Et	3- 	H	9.9 (s, 1H), 8.4 (s 1H), 8.1 (d, 1H), 8.0 (d. 1H), 7.6 (m, 3H), 7.4 (t, 1H), 7.2 (t, 1H), 4.4 (m, 3H), 1.8 (s, 3H), 1.3 (m, 6H)	324	Ref Ex 15
69	Et	3- 	H	10.5 (s, 1H), 8.6 (s, 1H), 8.2 (d, 2H), 8.1 (d, 1H), 8.0 (d, 2H), 7.8 (d, 1H), 7.6 (m, 2H), 7.4 (t, 1H), 7.2 (t, 1H), 4.4 (q, 2H), 1.3 (t, 3H)	340	Ref Ex 15
70	Et	3- 	H	10.0 (s, 1H), 8.4 (s, 1H), 8.0 (d, 1H), 7.6 (m, 3H), 7.4 (t, 1H), 7.2 (t, 1H), 4.4 (q, 2H), 2.6 (t, 2H), 2.45 (t, 2H), 1.3 (t, 3H)	310	Ref Ex 15 and [9]

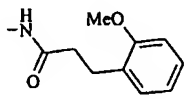
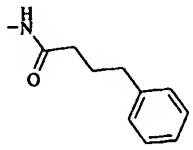
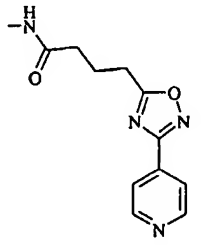
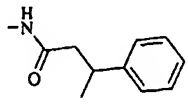
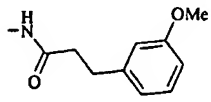
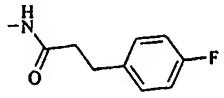
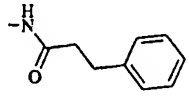
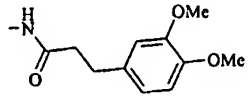
71	Et	3- 	H	10.3 (s, 1H), 9.2 (d, 1H), 8.6 (d, 1H), 8.5 (d, 1H), 8.0 (d, 1H), 7.8 (dd, 1H), 7.6 (ad, 2H), 7.4 (t, 1H), 7.2 (t, 1H), 4.4 (q, 2H), 1.2 (t, 3H)	322	Ref Ex 15 and [10]
72	Et	3- 	H	10.25 (s, 1H), 8.5 (s, 1H), 8.05 (d, 1H), 7.9 (s, 1H), 7.7 (dd, 1H), 7.6 (d, 2H), 7.45 (t, 1H), 7.35 (d, 1H), 7.2 (t, 1H), 6.7 (m, 1H), 4.4 (q, 2H), 1.3 (t, 3H)	305	Ref Ex 15
73	Et	3- 	H	10.17 (s, 1H), 8.4 (s, 1H), 8.0 (d, 1H), 7.6 (m, 3H), 7.4 (m, 2H), 7.2 (t, 1H), 7.0 (m, 2H), 4.4 (q, 2H), 3.9 (t, 3H), 1.3 (t, 3H)	335	Ref Ex 15
74	Et	3- 	H	10.0 (s, 1H), 8.5 (s, 1H), 8.1 (d, 1H), 8.0 (s, 1H), 7.7 (d, 1H), 7.6 (d, 2H), 7.4 (t, 1H), 7.2 (t, 1H), 4.4 (q, 2H), 4.0 (s, 3H), 1.3 (t, 3H)	385 / 387	Ref Ex 15
75	Et	3- 	H	10.0 (s, 1H), 8.4 (s, 1H), 8.1 (d, 1H), 7.6 (m, 3H), 7.4 (t, 1H), 7.2 (t, 1H), 4.4 (q, 2H), 2.6 (s, 3H), 2.4 (s, 3H), 1.3 (t, 3H)	334	Ref Ex 15
76	Et	3- 	H	10.9 (s, 1H), 9.8 (s, 1H), 8.6 (d, 1H), 8.1 (d, 1H), 7.8 (dd, 1H), 7.6 (m, 2H), 7.4 (t, 1H), 7.2 (t, 1H), 4.4 (q, 2H), 1.3 (t, 3H)	323	Ref Ex 15

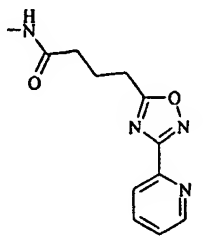
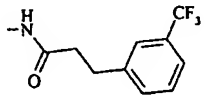
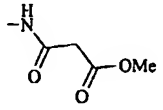
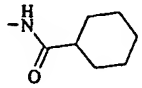
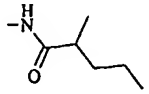
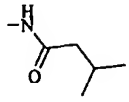
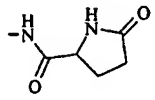
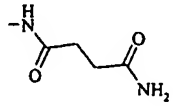
77	Et	3- 	H	9.8 (s, 1H), 8.4 (s, 1H), 8.2 (s, 1H), 8.1 (d, 1H), 7.7 (d, 1H), 7.6 (d, 2H), 7.4 (t, 1H), 7.2 (t, 1H), 6.6 (s, 1H), 4.4 (q, 2H), 2.3 (s, 3H), 1.3 (t, 3H)	319	Ref Ex 15 and [11]
78	Et	3- 	H	10.0 (s, 1H), 8.4 (s, 1H), 8.0 (d, 1H), 7.5 (m, 3H), 7.4 (t, 1H), 7.2 (t, 1H), 4.4 (q, 2H), 3.4-3.1 (m, 3H), 3.0-2.7 (m, 2H), 2.6 (d, 2H), 2.4-2.2 (m, 1H), 2.0-1.8 (m, 1H), 1.3 (t, 3H)	371	Ref Ex 15 and [12]
79	Et	3- 	H	9.9 (s, 1H), 8.5 (s, 1H), 8.0 (d, 1H), 7.8 (d, 1H), 7.6 (m, 2H), 7.4 (t, 1H), 7.2 (t, 1H), 6.1 (brs, 2H), 4.4 (q, 2H), 1.3 (t, 3H)	321	Ref Ex 15
80	Et	3- 	H	10.64 (s, 1H), 8.7 (s, 1H), 8.5 (s, 1H), 8.2 (s, 1H), 8.1 (d, 1H), 7.7 (d, 1H), 7.6 (m, 2H), 7.4 (t, 1H), 7.2 (t, 1H), 4.4 (q, 2H), 1.3 (t, 3H)	322	Ref Ex 15 and [13]
81	*i*-Pr	3- 	H	9.92 (s, 1H), 8.45 (d, 2H), 8.36 (s, 1H), 8.03 (d, 1H), 7.63 (t, 2H), 7.48 (d, 1H), 7.39 (t, 1H), 7.28 (d, 2H), 7.13 (t, 1H), 5.05 (m, 1H), 2.96 (t, 2H), 2.69 (t, 2H), 1.60 (d, 6H)	358	Ex 8 and Meth 3

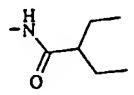
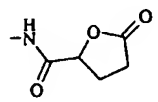
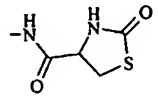
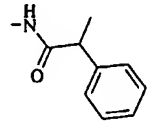
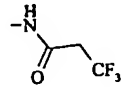
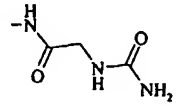
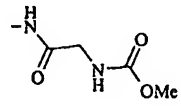
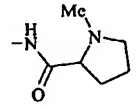
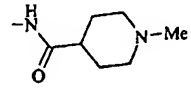
82	Et	3- 	H	9.93 (s, 1H), 8.43 (s, 1H), 8.05 (d, 1H), 7.56 (m, 3H), 7.44 (t, 1H), 7.16 (t, 1H), 4.39 (q, 2H), 4.02 (d, 2H), 2.78 (m, 2H), 2.53 (m, 1H), 1.79 (d, 2H), 1.54 (m, 2H). 1.42 (s, 9H), 1.28 (t, 3H)	422	Ref Ex 15

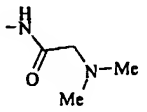
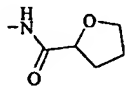
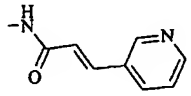
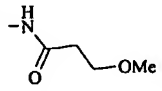
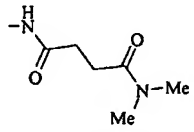
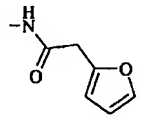
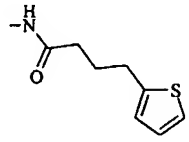
Ex	R^a	R^b	R^c	M/z	SM
83	Et	3- 	H	373	Ref Ex 15
84	Et	3- 	H	387	Ref Ex 15
85	Et	3- 	H	411	Ref Ex 15 and [14]
86	Et	3- 	H	425	Ref Ex 15 and Meth 29
87	Et	3- 	H	425	Ref Ex 15 and Meth 31

5

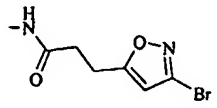
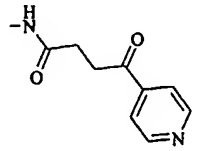
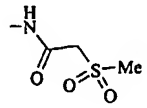
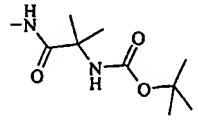
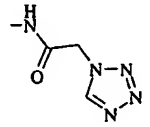
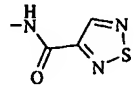
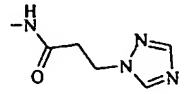
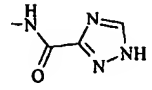
88	Et	3- 	H	373	Ref Ex 15
89	Et	3- 	H	357	Ref Ex 15
90	Et	3- 	H	426	Ref Ex 15
91	Et	3- 	H	357	Ref Ex 15
92	Et	3- 	H	373	Ref Ex 15
93	Et	3- 	H	361	Ref Ex 15
94	Et	3- 	H	343	Ref Ex 15
95	Et	3- 	H	403	Ref Ex 15

96	Et	3- 	H	426	Ref Ex 15
97	Et	3- 	H	411	Ref Ex 15
98	Et	3- 	H	315	Ref Ex 15
99	Et	3- 	H	321	Ref Ex 15
100	Et	3- 	H	309	Ref Ex 15
101	Et	3- 	H	295	Ref Ex 15
102	Et	3- 	H	322	Ref Ex 15
103	Et	3- 	H	310	Ref Ex 15

104	Et	3- 	H	309	Ref Ex 15
105	Et	3- 	H	323	Ref Ex 15
106	Et	3- 	H	400	Ref Ex 15
107	Et	3- 	H	343	Ref Ex 15
108	Et	3- 	H	321	Ref Ex 15
109	Et	3- 	H	311	Ref Ex 15
110	Et	3- 	H	326	Ref Ex 15
111	Et	3- 	H	322	Ref Ex 15
112	Et	3- 	H	336	Ref Ex 15

113	Et	3- 	H	296	Ref Ex 15
114	Et	3- 	H	279	Ref Ex 15
115	Et	3- 	H	309	Ref Ex 15
116	Et	3- 	H	342	Ref Ex 15
117	Et	3- 	H	297	Ref Ex 15
118	Et	3- 	H	338	Ref Ex 15
119	Et	3- 	H	319	Ref Ex 15
120	Et	3- 	H	363	Ref Ex 15

5

121	Et	3- 	H	413	Ref Ex 15 and Meth 33
122	Et	3- 	H	372	Ref Ex 15
123 [15]	Et	3- 	H	331	Ref Ex 15
124 [15]	Et	3- 	H	396	Ref Ex 15
125 [15]	Et	3- 	H	321	Ref Ex 15
126 [15]	Et	3- 	H	323	Ref Ex 15 and [16]
127 [15]	Et	3- 	H	334	Ref Ex 15 and [17]
128 [15]	Et	3- 	H	306	Ref Ex 15

[1] Resultant compound was purified by flash column chromatography

[2] Double bond of E stereochemistry

[3] Pol J Chem, 1983, 57, 839 - 47

[4] Lancelot J.C. et. al., Chem. Pharm. Bull., 1984, 32 (11), 4447-54

[5] Starting Material was 9-(4-aminophenyl)carbazole

[6] PL 163595

[7] Canad. J. Chem, 1970, 48, 1566-73

[8] J Prakt Chem/Chem Ztg, 1996, 338, 731-737

[9] J Org Chem, 1966, 31, 3948-51

[10] Org Prep Proced Int, 1999, 31, 693-4

[11] J Org Chem, 1981, 46, 2473-6

[12] J Chem Soc (C), 1967. 2156-70

[13] J Chem Soc, 1964, 446-51

[14] J Braz Chem Soc, 1993, 4, 84-5

[15] HOBT was used instead of DMAP

[16] J Org Chem, 1967, 32, 2823-8

[17] J Amer Chem Soc, 1955, 77, 2572

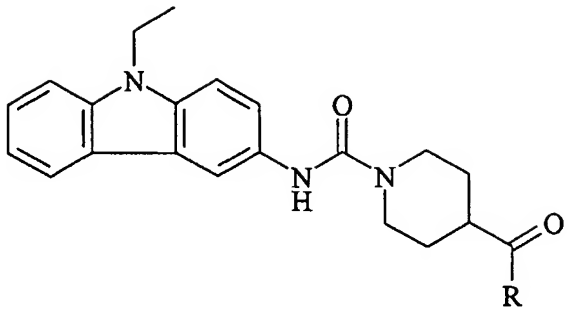
Example 129

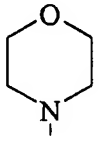
9-Ethyl-3-[(4-*N*-methylcarbamoylpiperid-1-yl)carbonylamino]carbazole

9-Ethyl-3-[(4-carboxypiperid-1-yl)carbonylamino]carbazole (Example 187; 250 mg, 0.68 mM), HOBT (105 mg, 0.68 mM), EDAC (132 mg, 0.68 mM), DMF (10 ml) and methylamine (8 M in EtOH, 0.17 ml, 1.4 mM) were stirred at room temperature overnight and then evaporated to dryness. The residue was dissolved in DCM (10 ml), washed with water (5 ml), extracted with hydrochloric acid (2 M). The extraction was allowed to stand for 15 mins and the solid precipitate was collected by filtration. NMR: 8.45 (s, 1H), 8.13 (s, 1H), 8.01 (d, 1H), 7.71 (m, 1H), 7.53 (d, 1H), 7.45 (s, 2H), 7.40 (t, 1H), 7.13 (t, 1H), 4.37 (q, 2H), 4.16 (d, 2H), 2.80 (t, 2H), 2.57 (d, 3H), 2.31 (m, 1H), 1.69 (m, 2H), 1.51 (m, 2H), 1.28 (t, 3H); m/z 379.

Examples 130-132

The following compounds were prepared by the procedure of Example 129 using 9-ethyl-3-[(4-carboxypiperid-1-yl)carbonylamino]carbazole (Example 187) and the appropriate amine.



Ex	R	NMR	M/z
130	Me_2N-	8.45 (s, 1H), 8.13 (s, 1H), 8.01 (d, 1H), 7.53 (d, 1H), 7.45 (s, 2H), 7.40 (t, 1H), 7.13 (t, 1H), 4.37 (q, 2H), 4.16 (d, 2H), 3.05 (s, 3H), 2.85 (m, 6H), 1.65 (m, 2H), 1.49 (m, 2H), 1.28 (t, 3H)	393
131	*n*-BuNH-	8.45 (s, 1H), 8.13 (s, 1H), 8.01 (d, 1H), 7.71 (t, 1H), 7.53 (d, 1H), 7.45 (s, 2H), 7.40 (t, 1H), 7.13 (t, 1H), 4.37 (q, 2H), 4.16 (d, 2H), 3.03 (q, 2H), 2.80 (t, 2H), 2.31 (m, 1H), 1.68 (d, 2H), 1.51 (m, 2H), 1.33 (m, 7H), 0.85 (t, 2H)	421
132		8.45 (s, 1H), 8.13 (s, 1H), 8.01 (d, 1H), 7.53 (d, 1H), 7.45 (s, 2H), 7.40 (t, 1H), 7.13 (t, 1H), 4.37 (q, 2H), 4.16 (d, 2H), 3.55 (brs, 8H), 2.87 (t, 2H), 1.65 (m, 2H), 1.52 (m, 2H), 1.28 (t, 3H)	435

Example 133

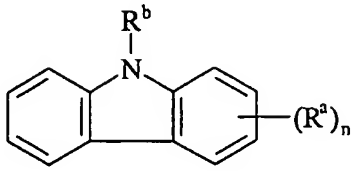
9-Ethyl-3-(2-methylpropionamido)carbazole

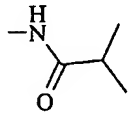
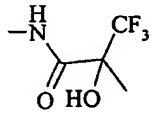
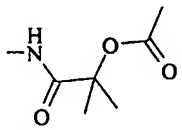
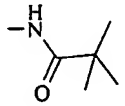
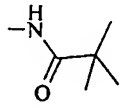
To a solution of 3-amino-9-ethylcarbazole (Reference Example 15; 4.20 g, 20 mmol) in DCM (50 ml) was added triethylamine (2.22 g, 22 mmol) and the stirred mixture was cooled in an ice/MeOH bath. A solution of *iso*-butyrylchloride (2.13 g, 20 mmol) in DCM (50 ml) was added slowly over 30 minutes and the reaction mixture was allowed to warm to ambient temperature and was stirred for 16 hours. The black mixture was washed with water (2 x 100 ml), brine (50 ml) and finally dried, filtered and reduced *in vacuo* to give a black residue, this was triturated with a 1:1 mixture of ether : isohexane (50 ml) then washed with a little ether to give the title product (3.19 g). NMR 1.13 (d, 6H), 1.29 (t, 3H), 2.62 (sept, 1H),

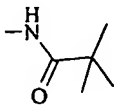
4.39 (q, 2H), 7.15 (t, 1H), 7.42 (t, 1H), 7.53 (m, 3H), 8.03 (d, 1H), 8.40 (s, 1H), 9.77 (s, 1H); MS (ES+) 281 $(MH)^+$.

Examples 134-139

The following compounds were prepared by the procedure of Example 133 using the appropriate starting materials.



Ex	$(R^a)_n$	R^b	NMR	M/z	SM
134	2- 	Et	8.20 (s, 1H), 8.00 (d, 1H), 7.94 (d, 1H), 7.58 (brs, 1H), 7.38 (m, 2H), 7.20 (dd, 1H), 6.94 (dd, 1H), 4.28 (q, 2H), 2.57 (m, 1H), 1.40 (t, 3H), 1.30 (d, 6H)	281.4	Ex 1
135	3- 	Et	9.9 (s, 1H), 8.45 (d, 1H), 8.05 (d, 1H), 7.7 (dd, 1H), 7.55 (t, 2H), 7.45 (t, 1H), 7.4 (s, 1H), 7.15 (t, 1H), 4.4 (q, 2H), 1.6 (s, 3H), 1.3 (t, 3H)	351	Ref Ex 15
136	3- 	Et	9.5 (s, 1H), 8.3 (s, 1H), 8.05 (d, 1H), 7.6-7.5 (m, 3H), 7.45 (t, 1H), 7.15 (t, 1H), 4.4 (q, 2H), 2.1 (s, 3H), 1.6 (s, 6H), 1.3 (t, 3H)	339	Ref Ex 15
137	2-Me, 3- 	*i*-Pr	8.92 (s, 1H), 8.07 (d, 1H), 7.83 (s, 1H), 7.62 (d, 1H), 7.52 (s, 1H), 7.37 (t, 1H), 7.12 (t, 1H), 5.07 (sept, 1H), 2.32 (s, 3H), 1.62 (d, 6H), 1.27 (s, 9H)	323.32	Ex 9
138	3- 	*i*-Pr	9.19 (s, 1H), 8.33 (s, 1H), 8.03 (d, 1H), 7.59 (m, 3H), 7.39 (t, 1H), 7.13 (t, 1H), 5.05 (m, 1H), 1.60 (d, 6H), 1.25 (s, 9H)	309	Ex 8

139	3- 	Et	1.27 (9H, s), 1.30 (3H, t), 4.40 (2H, qu), 7.15 (1H, t), 7.41 (1H, t), 7.48 - 7.63 (3H, m), 8.04 (1H, d), 8.35 (1H, s), 9.22 (1H, s)	295	Ref Ex 15

[1] Product purified by chromatography - eluent gradient of DCM to EtOAc

Example 140

9-Ethyl-3-(ethyloxyoxalylamino)carbazole

Ethyl oxalyl chloride (245 µl) was added to a solution of 9-ethyl-3-aminocarbazole (Reference Example 15; 350 mg) in THF (10 ml) containing calcium carbonate (110 mg). After stirring for 4 hours at ambient temperature the mixture was carefully acidified to pH = 3 using 1 M HCl and then extracted with EtOAc (2 x 20 ml). The combined organic extracts were washed with water (10 ml) and saturated brine (10 ml), dried and the solvents removed under reduced pressure. The resulting greenish solid was recrystallized twice from EtOAc to give the title compound (0.31 g). Mp 140-141°C; found : C, 69.8%; H, 5.8%: N, 8.9%; $C_{18}H_{18}N_2O_3$ requires C, 69.7%; H, 5.8%; N, 9.0%; NMR: 1.2-1.4 (6H, q), 4.3-4.5 (4H, m), 7.1-7.2 (1H, t), 7.4-7.5 (1H, t) 7.5-7.6 (2H, d), 7.7-7.8 (1H, d), 8.0-8.1 (1H, d), 8.5 (1H, s), 10.8 (1H, s); m/z 311.

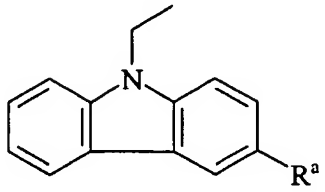
Example 141

9-Ethyl-3-mesylaminocarbazole

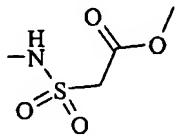
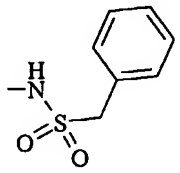
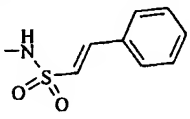
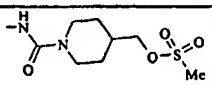
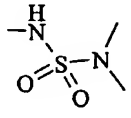
A solution of methanesulphonyl chloride (0.33 g, 2.9 mmol) in DCM (2.5 ml) was added over 5 minutes to a solution of 3-amino-9-ethylcarbazole (Reference Example 15; 0.50 g, 2.4 mmol), triethylamine (0.40 ml, 2.9 mmol) and DMAP (ca. 10 mg) in DCM (12 ml) at room temperature. The resulting dark coloured solution was stirred at room temperature for 18 hours. The mixture was diluted with DCM (13 ml) and washed with water (25 ml) and brine (25 ml). The organic phase was dried and evaporated *in vacuo* to leave a black solid. The crude product was purified by flash chromatography eluting with DCM to give the product as a light brown solid. NMR 9.40 (1H, s), 8.10 (1H, d), 7.98 (1H, s), 7.60 (2H, d), 7.45 (1H, t), 7.36 (1H, dd), 7.19 (1H, t), 4.41 (2H, q), 2.92 (3H, s), 1.32 (3H, t); MS (ES-) 287 (MH-).

Examples 142-146

The following compounds were prepared by the procedure of Example 141 using the appropriate sulphonyl chloride.



5

Ex	R^a	NMR	M/z	SM
142		9.85 (1H, s), 8.12 (1H, d), 7.98 (1H, s), 7.60 (2H, d), 7.44 (1H, t), 7.38 (1H, dd), 7.20 (1H, t), 4.41 (2H, q), 4.18 (2H, s), 3.66 (3H, s), 1.32 (3H, t)	345 (MH^-)	Ref Ex 15 and [1]
143		9.60 (1H, s), 8.08 (1H, d), 7.95 (1H, d), 7.58 (2H, dd), 7.42 (1H, t), 7.35 (6H, m), 7.19 (1H, t), 4.02 (4H, m), 1.32 (3H, t)	363 (MH^-)	Ref Ex 15
144 [2]		9.78 (1H, s), 8.08 (1H, d), 7.98 (1H, s), 7.68-7.12 (12H, m), 4.38 (2H, q), 1.25 (3H, t)	375 (MH^-)	Ref Ex 15
145		8.13 (s, 1H), 8.01 (d, 1H), 7.53 (d, 1H), 7.45 (s, 2H), 7.40 (t, 1H), 7.13 (t, 1H), 5.39 (s, 1H), 4.37 (q, 2H), 4.19 (d, 2H), 4.11 (d, 2H), 3.16 (s, 3H), 2.81 (t, 2H), 1.93 (brs, 3H), 1.71 (d, 2H), 1.28 (t, 3H), 1.23 (m, 2H)	430	Ex 175
146		9.60 (s, 1H), 8.07 (d, 1H), 7.95 (s, 1H), 7.54 (m, 2H), 7.40 (m, 2H), 7.18 (t, 1H), 4.38 (q, 2H), 2.67 (s, 6H), 1.28 (t, 3H)	317.9	Ref Ex 15

[1] Syn, 1979, 5, 321-2

[2] Double bond of (E)-stereochemistry

Example 147

9-Ethyl-3-[*N*-(2-pyridin-4-ylethyl)carbamoyl]carbazole

To a solution of 9-ethyl-3-carboxycarbazole (Method 11; 1.96 g, 8.2 mmol), DMAP (1.1 g, 9 mmol) and EDAC (1.72 g, 9 mmol) in DMF (15 ml) at room temperature was added 3-pyridin-4-ylpropylamine (1.05 g, 8.6 mmol). After 18 hours water (100 ml) was added and the mixture extracted with DCM (3 x 100 ml). The organic layers were concentrated to give a brown gum which was purified by flash column chromatography (Z3). Yield 851 mg (30%). NMR 8.64 (s, 1H), 8.56 (t, 1H), 8.44 (d, 2H), 8.15 (d, 1H), 7.94 (d, 1H), 7.64 (d, 2H), 7.49 (t, 1H), 7.27 (m, 3H), 4.43 (q, 2H), 3.58 (q, 2H), 2.90 (t, 2H), 1.31 (t, 3H); MS (ES+) 344.3 [MH^+].

Example 148

9-Ethyl-3-carbamoylcarbazole

To a solution of 9-ethyl-3-carboxycarbazole (Method 11; 7.347 g, 30.7 mmol) and triethylamine (4.32 ml, 31 mmol) in dry THF (100 ml) was added ethyl chloroformate (2.96 ml, 31 mmol) slowly at 0°C under an argon atmosphere. 2 hours after warming to room temperature ammonium hydroxide (30 ml) was added slowly. After 3 hours the reaction mixture was concentrated, water (100 ml) was added and the mixture extracted with EtOAc (2 x 100 ml). The organic layer was dried and concentrated to give a yellow solid. Yield 5.76 g (79%). Rf (Z1) 0.33; NMR 8.72 (s, 1H), 8.17 (d, 1H), 8.01 (d, 1H), 7.62 (d, 2H), 7.46 (t, 1H), 7.22 (t, 1H), 6.38 (brs, 1H), 4.47 (q, 2H), 1.31 (t, 3H); m/z 239.4.

Example 149

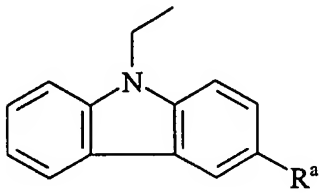
9-Ethyl-3-aminomethylcarbazole

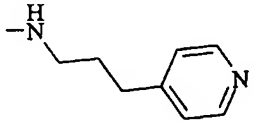
To a solution of 9-ethyl-3-carbamoylcarbazole (Example 148; 5.5 g, 23.1 mmol) in dry THF (100 ml) was added lithium aluminium hydride (1 M solution in THF; 25 ml, 25 mmol) slowly at 0°C under an argon atmosphere. After complete addition the mixture was heated to reflux for 72 hours. After cooling to 0°C, water (100 ml) then 15% w/v sodium hydroxide solution (100 ml) were added to the orange mixture before stirring for 1 hour. The mixture was filtered under vacuum before the filtrate was concentrated, water (100 ml) was added followed by extraction with DCM (2 x 100 ml). The organic layer was dried over

sodium sulphate and concentrated to give a yellow oil. Chromatography (eluent gradient of Z4 to Z6 then Z7 to Z8) gave a brown oil which solidified on standing. Yield 902 mg (17%). Rf (Z2) 0.5; NMR ($CDCl_3$) 8.06 (d, 1H), 8.01 (s, 1H), 7.45 (m, 4H), 7.23 (m, 1H), 4.34 (q, 2H), 4.02 (s, 2H), 1.42 (t, 3H); m/z 208.3 $[M - NH_3]^+$.

Example 150

The following compound was prepared by the procedure of Example 149 using the appropriate starting materials.



Ex	R^a	NMR ($CDCl_3$)	M/z	SM
150 [1]		8.50 (d, 2H), 7.98 (d, 1H), 7.42 (t, 1H), 7.25 (m, 6H), 6.83 (dd, 1H), 4.29 (q, 2H), 3.27 (t, 2H), 2.78 (t, 2H), 2.04 (m, 2H), 1.39 (t, 3H)	330.5	Ex 15

[1] Purified on an ISOLUTE column (10 g) (eluent gradient of Z9 to Z1 then to Z10)

Example 151

9-Ethyl-3-[(2-methylpropionamido)methyl]carbazole

To a solution of 9-ethyl-3-aminomethylcarbazole (Example 149; 300 mg, 1.34 mmol) and diisopropylethylamine (244 µl, 1.4 mmol) in DCM (5 ml), isobutyryl chloride (155 µl, 1.4 mmol) was slowly added. After stirring at room temperature for 2 hours, water (5 ml) was added before the organic layer was concentrated. Chromatography on a Bond Elut column (eluent gradient of Z11 to Z1) gave a white solid. Yield 158 mg (40%). Rf (Z1) 0.5; NMR ($CDCl_3$) 8.08 (d, 1H), 8.00 (s, 1H), 7.49 (t, 1H), 7.39 (m, 3H), 7.22 (m, 1H), 5.73 (brs, 1H), 4.60 (d, 2H), 4.37 (q, 2H), 2.40 (m, 1H), 1.20 (d, 6H); m/z 295.4.

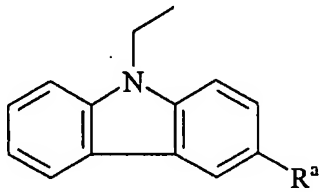
Example 152

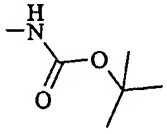
9-Ethyl-3-isopropoxycarbonylaminocarbazole

To a solution of 3-amino-9-ethylcarbazole (Reference Example 15; 1.050 g, 5 mmol) in DCM (20 ml) was added triethylamine (0.555 g 5.5 mmol) and the resultant mixture was cooled in an ice bath. A 1.0 M solution of *iso*-propylchloroformate in toluene (5 ml, 5 mmol) was added slowly over 30 minutes at ambient temperature and the resultant mixture was stirred for 16 hours. A white precipitate formed which was removed by filtration and the black filtrate was washed with water (2 x 25 ml), brine (25 ml) and finally dried, filtered and reduced *in vacuo* to give a black residue which was purified by chromatography on a Bond Elut column (20 g) eluting with DCM. The residue thus obtained was crystallised in 1 : 1 ether : isohexane to give the title product as a pale brown solid. NMR 1.27 (9H, m), 4.40 (2H, q), 4.94 (1H, m), 7.16 (1H, t), 7.43 (2H, t), 7.53 (1H, d), 7.58 (1H, d), 8.04 (1H, d), 8.26 (1H, s), 9.48 (1H, s); m/z 297.

Example 153

The following compound was prepared by the procedure of Example 152 using 3-amino-9-ethylcarbazole (Reference Example 15) and the stated starting material.



Ex	R^a	NMR	M/z	SM
153		1.26 (3H, t), 1.49 (9H, s), 4.36 (2H, q), 7.13 (1H, t), 7.34-7.56 (4H, m), 8.02 (1H, d), 8.23 (1H, s), 9.18 (1H, s)	311	di-*tert*-butyldicarbonate

Example 154

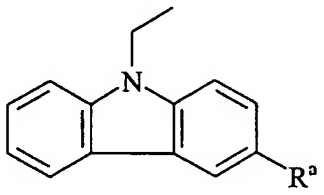
3-(*N*-Methyl-3-pyrid-4-ylpropionamido)-9-ethylcarbazole

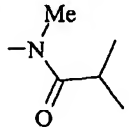
Sodium Hydride (60% dispersion in oil; 65 mg, 1.5 mM) was added to a solution of 3-(3-pyrid-4-ylpropionamido)-9-ethylcarbazole (Example 15; 500 mg, 1.5 mM) in THF (10 ml) at 0°C under an argon atmosphere. After heating to 50°C for 2 hours the mixture was allowed

to cool to room temperature and methyl iodide (0.1 ml, 1.5 mM) was added dropwise. After heating to 50°C for 2 hours the mixture was allowed to cool to room temperature. Water (30 ml) was added and the resulting mixture was extracted with EtOAc (3 x 50 ml). The organic layers were concentrated and then purified by flash column chromatography to give a brown gum. Yield 225 mg (43%). NMR 8.32 (d, 2H), 8.11 (d, 1H), 7.88 (s, 1H), 7.64-7.56 (m, 2H), 7.45 (t, 1H), 7.28 (m, 1H), 7.19 (t, 1H), 7.05 (d, 2H), 4.42 (q, 2H), 3.25 (s, 3H), 2.78 (t, 2H), 2.35 (t, 2H), 1.30 (t, 3H); m/z 358.4.

Example 155

The following compounds were prepared by the procedure of Example 154 using the appropriate starting materials.



Ex	R^a	NMR ($CDCl_3$)	M/z	SM
155		8.09 (d, 1H), 7.89 (s, 1H), 7.55-7.48 (m, 1H), 7.47-7.39 (m, 2H), 7.30-7.20 (m, 2H), 4.40 (q, 2H), 3.35 (s, 3H), 2.58 (dt, 1H), 1.48 (t, 3H), 1.05 (d, 6H)	295.4	Ex 133

Example 156

3-(*N'*-Propylureido)-9-ethylcarbazole

To a solution of 3-amino-9-ethylcarbazole (Reference Example 15; 1.00 g, 4.8 mM) and triethylamine (0.8 ml, 4.8 mM) in DMF (20 ml) at 0°C was added *N*-propylisocyanate (0.42 ml, 4.8 mM). After 90 minutes water (100 ml) was added and the resultant solid filtered off, washed with water (300 ml) then recrystallized from EtOAc, as a white powder. Yield 700 mg (50%). NMR 8.28 (s, 1H), 8.16 (s, 1H), 8.02 (d, 1H), 7.52 (m, 1H), 7.38 (m, 3H), 7.12 (t, 1H), 6.02 (t, 1H), 4.36 (t, 2H), 3.06 (q, 2H), 1.45 (m, 2H), 1.28 (t, 3H), 0.89 (t, 3H); m/z 296.5.

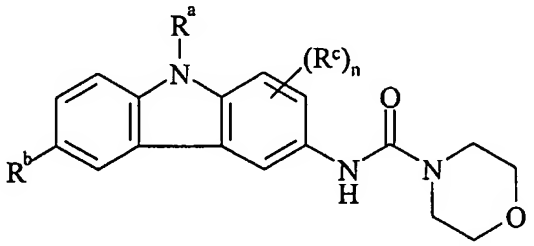
Example 157

3-(*N',N'*-Diethylureido)-9-ethylcarbazole

To a solution of 3-amino-9-ethylcarbazole (Reference Example 15; 1.00 g, 4.8 mM) and triethylamine (0.8 ml, 4.8 mM) in DMF (10 ml) at 0°C was added diethylcarbamoyl chloride (0.60 ml, 4.8 mM). After warming to room temperature and stirring for 48 hours, diethylcarbamoyl chloride (0.30 ml, 2.4 mM) was added. After 24 hours a mixture of MeOH : water; 1 : 2 (50 ml) was added and the suspension was concentrated to give a white solid. Yield 327 mg (22%). Rf (Z11) 0.53; NMR 8.12 (d, 2H), 8.03 (d, 1H), 7.48 (m, 4H), 7.12 (t, 1H), 4.37 (q, 2H), 3.36 (q, 4H), 1.28 (t, 3H), 1.10 (t, 6H); m/z 310.4.

Examples 158 - 161

The following compounds were prepared by the procedure of Example 157 using morpholine chloroformate and the appropriate carbazole.



Ex	R^a	R^b	$(R^c)_n$	NMR	M/z	SM
158	CF_3CH_2-	H	H	8.60 (s, 1H), 8.15 (s, 1H), 8.03 (d, 1H), 7.66 (d, 1H), 7.57 (d, 1H), 7.45 (m, 2H), 7.22 (t, 1H), 5.34 (q, 2H), 3.63 (t, 4H), 3.45 (t, 4H)	378.51	Ex 7
159	Et	Br	H	($CDCl_3$) 8.07 (1H, d), 7.96 (1H, d), 7.50 (1H, dd), 7.40 (1H, dd), 7.27 (1H, d), 7.20 (1H, d), 6.52 (1H, brs), 4.14 (2H, q), 3.75 (4H, t), 3.47 (4H, t), 1.36 (3H, t)	402/404	Ref Ex 18

160	i-Pr	H	H	8.53 (1H, s), 8.17 (1H, d), 8.03 (1H, d), 7.64 (1H, d), 7.57 (1H, d), 7.42 (1H, dd), 7.38 (1H, t), 7.12 (1H, t), 5.05 (1H, septet), 3.63 (4H, t), 3.46 (4H, t), 1.59 (6H, d)	338.39	Ex 8
161	Et	CN	H	1.3 (t, 3H), 3.4 (m, 4H), 3.6 (m, 4H), 4.4 (q, 2H), 7.5 (q, 2H), 7.7 (q, 2H), 8.2 (s, 1H), 8.6 (d, 2H)	349	Ex 11

Example 162

3-[4-(Pyrid-4-ylmethyl)phthalazin-1-ylamino]-9-ethylcarbazole

1-Chloro-4-(pyrid-4-ylmethyl)phthalazine (Method 15; 100 mg, 0.39 mmol) and 3-amino-9-ethylcarbazole (Reference Example 15; 0.47 mmol) in isopropanol (1 ml) containing 5.5 M HCl in isopropanol (78 µl, 0.43 mmol) was heated at 85°C for 5 min. Further isopropanol (5 ml) was added and heating was continued for 2 days. After cooling , the precipitate was filtered, washed with ether and dried under vacuum to give the title product (121 mg). NMR (500 MHz) 11.5 (1H, brs), 8.95 (1H, m), 8.61 (2H, d), 8.32 (2H, m), 8.24 (2H, m), 8.16 (1H, d), 7.81 (1H, d), 7.68 (1H, d), 7.58 (3H, m), 7.52 (1H, t), 7.24 (1H, t), 4.70 (2H, s), 4.52 (2H, q), 1.36 (3H, t); m/z 429.

Example 163

(E)-3-(4,4,4-Trifluoro-3-oxo-1-buten-1-yl)-9-ethylcarbazole

3-Formyl-9-ethylcarbazole (1.12 g, 5 mmol) was dissolved in anhydrous THF (30 ml) and piperidine (0.4 g) and acetic acid (0.4 g) were added and the mixture cooled to 0°C under argon. Trifluoroacetone (2 ml) in dry THF (10 ml) was added over 5 minutes and then the reaction mixture was allowed to warm to room temperature and stirred for 16 hours before evaporating to dryness. The residue was dissolved in EtOAc (50 ml), washed with ammonium chloride solution (2 x 50 ml), dried, filtered and concentrated. The crude product was purified by chromatography using 20% DCM in isohexane as eluent to give the product as a red solid (655 mg, 41%). NMR ($CDCl_3$) 8.35 (1H, d), 8.2 (1H, d), 8.12 (1H, d), 7.75 (1H, dd), 7.5 (1H, m), 7.4 (2H, m), 7.3 (1H, m), 7.05 (1H, d), 2.38 (2H, q), 1.45 (3H, t); m/z 318.

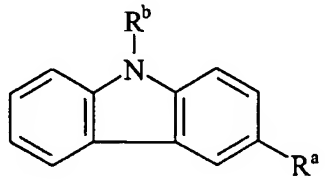
Example 164

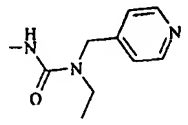
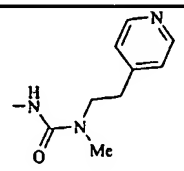
3-Morpholinocarbonylamino-9-ethylcarbazole

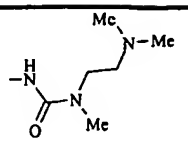
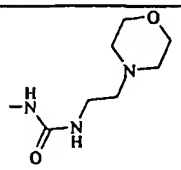
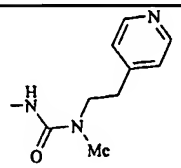
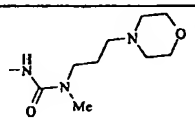
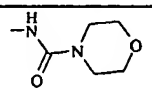
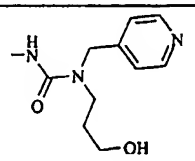
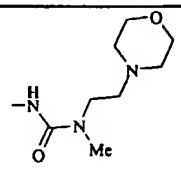
To a solution of 3-(4-nitrophenoxycarbonylamino)-9-ethylcarbazole (Example 12; 250 mg, 0.67 mmol) and DMAP (4 mg, 0.03 mmol), in EtOAc (10 ml) was added morpholine (0.067 ml, 0.73 mmol) at ambient temperature. The mixture was stirred for 18 hours then filtered to give the title product 145 mg (67 %). NMR 1.28 (t, 3H), 3.44 (m, 4H), 3.63 (m, 4H), 4.37 (q, 2H), 7.13 (t, 1H), 739 (t, 1H), 7.45 (s, 2H), 7.52 (d, 1H), 8.00 (d, 1H), 8.13 (s, 1H), 8.51 (s, 1H); m/z 324.

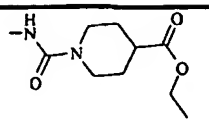
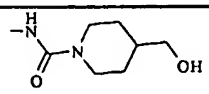
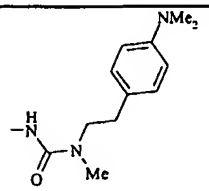
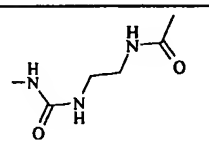
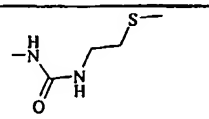
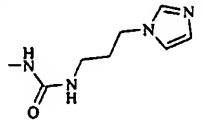
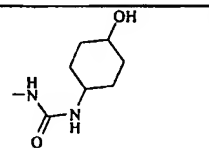
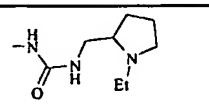
Examples 165 - 238

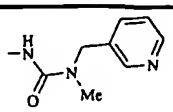
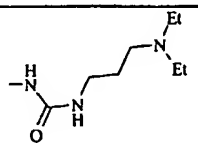
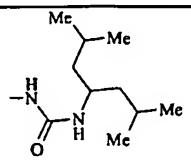
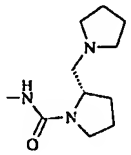
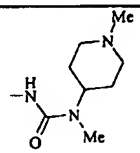
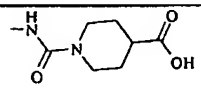
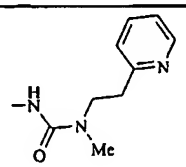
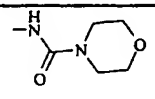
The following compounds were prepared by the procedure of Example 164 using 3-(4-nitrophenoxycarbonylamino)-9-ethylcarbazole (Example 12) or 3-(4-nitrophenoxycarbonyl-amino)-9-mesylcarbazole (Example 13) or 3-(4-nitrophenoxycarbonylamino)-9-(*N,N*-dimethylsulphamoyl)carbazole (Example 14) and the appropriate amine.

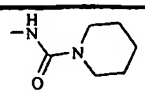
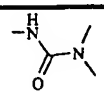
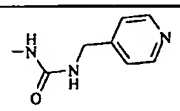
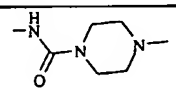
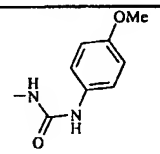
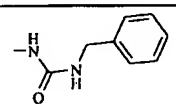
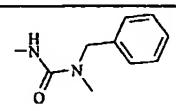
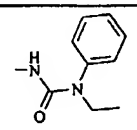


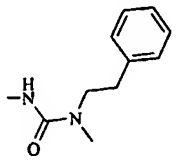
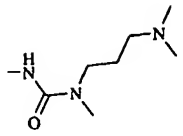
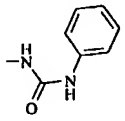
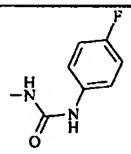
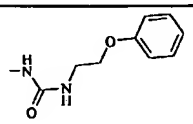
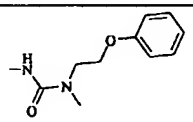
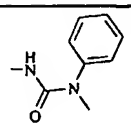
Ex	R^a	R^b	NMR / HPLC (Method A)	M/z
165		Et	1.11 (t, 3H), 1.28 (t, 3H), 3.43 (q, 4H), 4.37 (q, 4H), 4.61 (s, 2H), 7.13 (t, 1H), 7.28 (d, 1H), 7.40 (t, 1H), 7.48 (s, 2H), 7.53 (d, 1H), 8.03 (d, 1H), 8.16 (s, 1H), 8.43 (s, 1H), 8.51 (d, 2H)	373
166		Et	1.28 (t, 3H), 2.85 (t, 2H), 2.95 (s, 3H), 3.60 (t, 2H), 4.39 (q, 2H), 7.13 (t, 1H), 7.29 (d, 2H), 7.43 (m, 3H), 7.53 (d, 1H), 8.01 (d, 1H), 8.09 (s, 1H), 8.13 (s, 1H), 8.47 (d, 2H)	372

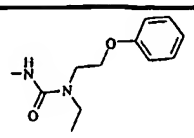
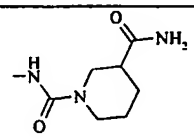
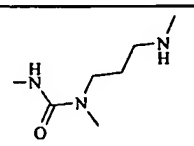
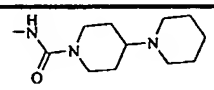
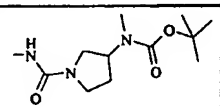
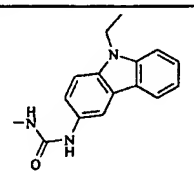
167		Et	1.28 (t, 3H), 2.23 (s, 6H), 2.44 (t, 2H), 2.95 (s, 3H), 3.40 (t, 2H), 4.39 (q, 2H), 7.13 (t, 1H), 7.43 (m, 3H), 7.53 (d, 1H), 8.01 (d, 1H), 8.12 (s, 1H), 8.83 (s, 1H)	339
168		Et	1.28 (t, 3H), 2.40 (m, 6H), 3.23 (m, 2H), 3.59 (m, 4H), 4.37 (q, 2H), 6.00 (t, 1H), 7.13 (t, 1H), 7.40 (m, 3H), 7.52 (d, 1H), 8.01 (d, 1H), 8.17 (s, 1H), 8.51 (s, 1H)	367
169		$MeSO_2$-	2.94 (t, 2H), 3.04 (s, 3H), 3.29 (s, 3H), 3.68 (t, 2H), 7.36 (d, 2H), 7.50 (t, 1H), 7.60 (m, 2H), 7.95 (d, 1H), 8.08 (d, 1H), 8.15 (d, 1H), 8.40 (s, 1H), 8.51 (m, 3H)	423.4
170 [1]		Et	1.28 (t, 3H), 1.69 (m, 2H), 2.32 (m, 6H), 2.93 (s, 3H), 3.35 (t, 2H), 3.55 (m, 4H), 4.37 (q, 2H), 7.13 (t, 1H), 7.40 (t, 1H), 7.45 (s, 2H), 7.53 (d, 1H), 8.01 (d, 1H), 8.12 (s, 1H), 8.33 (s, 1H)	395
171		$MeSO_2$-	3.21 (s, 3H), 3.42 (t, 4H), 3.61 (t, 4H), 7.44 (t, 1H), 7.53 (m, 2H), 7.90 (d, 1H), 8.00 (d, 1H), 8.09 (d, 1H), 8.28 (s, 1H), 8.72 (s, 1H)	374.4
172		Et	1.28 (t, 3H), 1.71 (m, 2H), 3.45 (m, 4H), 4.37 (q, 2H), 4.61 (s, 2H), 4.83 (s, 1H), 7.13 (t, 1H), 7.28 (d, 1H), 7.40 (t, 1H), 7.45 (s, 1H), 7.55 (d, 1H), 8.03 (d, 1H), 8.15 (s, 1H), 8.52 (d, 2H), 8.56 (s, 1H)	403
173 [2]		Et	8.43 (s, 1H), 8.12 (s, 1H), 8.01 (d, 1H), 7.53 (d, 1H), 7.45 (s, 2H), 7.40 (t, 1H), 7.13 (t, 1H), 4.37 (q, 2H), 3.56 (m, 4H), 3.45 (t, 2H), 2.97 (s, 3H), 2.45 (m, 6H), 1.28 (t, 3H)	381

174		Et	8.47 (s, 1H), 8.13 (s, 1H), 8.01 (d, 1H), 7.53 (d, 1H), 7.45 (s, 2H), 7.40 (t, 1H), 7.13 (t, 1H), 4.37 (q, 2H), 4.07 (m, 4H), 2.93 (m, 2H), 2.56 (m, 1H), 1.85 (m, 2H), 1.52 (m, 2H), 1.28 (t, 3H), 1.19 (t, 1H)	394
175		Et	8.40 (s, 1H), 8.13 (s, 1H), 8.01 (d, 1H), 7.53 (d, 1H), 7.45 (s, 2H), 7.40 (t, 1H), 7.13 (t, 1H), 4.45 (t, 1H), 4.37 (q, 2H), 4.16 (m, 2H), 3.17 (m, 2H), 2.76 (t, 2H), 1.63 (m, 3H), 1.28 (t, 3H), 1.08 (m, 2H)	352
176 3		Et	8.11 (m, 2H), 8.01 (d, 1H), 7.53 (d, 1H), 7.45 (s, 2H), 7.40 (t, 1H), 7.13 (t, 1H), 7.08 (d, 2H), 6.68 (d, 2H), 4.37 (q, 2H), 3.48 (t, 2H), 2.93 (s, 3H), 2.83 (s, 6H), 2.71 (t, 2H), 1.28 (t, 3H)	415
177		Et	RT: 2.45 mins	339
178		Et	RT: 2.95 mins	328
179		Et	RT: 1.86 mins	362
180		Et	RT: 2.66 mins	352
181		Et	RT: 1.95 mins	365

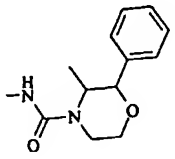
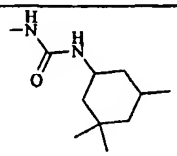
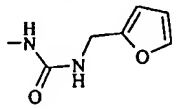
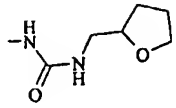
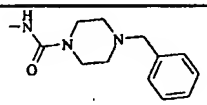
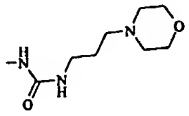
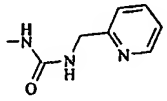
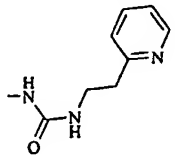
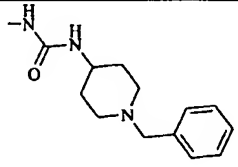
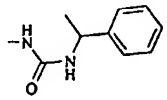
182		Et	RT: 1.99 mins	359
183		Et	RT: 1.92 mins	367
184 4		Et	RT: 3.97 mins	380
185 5		Et	RT: 1.98 mins	391
186		Et	8.2 (s, 1H), 8.15 (s, 1H), 8.0 (d, 1H), 7.55 (d, 1H), 7.45 (s, 2H), 7.4 (t, 1H), 7.15 (t, 1H), 4.4 (q, 2H), 4.1-4.0 (m, 1H), 2.85 (s, 3H)	365
187		Et	8.47 (s, 1H), 8.13 (s, 1H), 8.01 (d, 1H), 7.53 (d, 1H), 7.45 (s, 2H), 7.40 (t, 1H), 7.13 (t, 1H), 4.37 (q, 2H), 4.05 (m, 2H), 2.92 (m, 2H), 2.44 (m, 1H), 1.85 (m, 2H), 1.51 (m, 2H), 1.28 (t, 3H)	366
188		Et	1.28 (t, 3H), 2.92 (s, 3H), 3.01 (t, 2H), 3.71 (t, 2H), 4.39 (q, 2H), 7.13 (t, 1H), 7.21 (dd, 1H), 7.32 (d, 1H), 7.40 (t, 1H), 7.45 (s, 2H), 7.53 (d, 1H), 7.71 (t, 1H), 8.01 (d, 1H), 8.12 (s, 1H), 8.32 (s, 1H), 8.52 (d, 1H)	373
189		Me_2NSO_2-	8.71 (s, 1H), 8.25 (s, 1H), 8.03 (m, 2H), 7.91 (d, 1H), 7.49 (m, 2H), 7.36 (t, 1H), 3.61 (m, 4H), 3.48 (m, 4H), 2.74 (s, 6H)	403.5

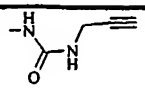
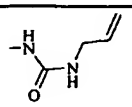
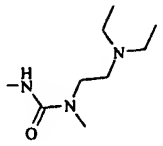
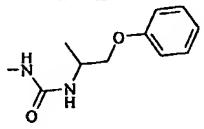
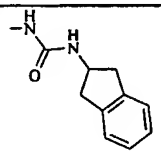
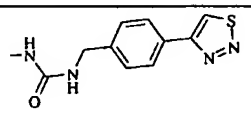
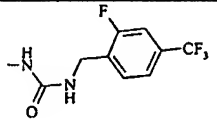
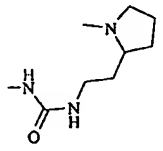
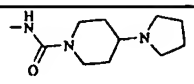
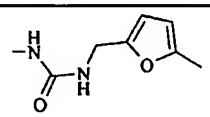
190		Et	1.28 (t, 3H), 1.53 (m, 6H), 3.43 (m, 4H), 4.37 (q, 2H), 7.13 (t, 1H), 7.39 (t, 1H), 7.45 (s, 2H), 7.52 (d, 1H), 8.00 (d, 1H), 8.13 (s, 1H), 8.51 (s, 1H)	322
191		Et	1.28 (t, 3H), 2.92 (s, 6H), 4.37 (q, 2H), 7.13 (t, 1H), 7.39 (t, 1H), 7.45 (s, 2H), 7.52 (d, 1H), 8.00 (d, 1H), 8.13 (s, 1H), 8.24 (s, 1H)	282
192		Et	1.28 (t, 3H), 4.37 (m, 4H), 6.68 (t, 1H), 7.13 (t, 1H), 7.31 (d, 1H), 7.45 (m, 6H), 8.00 (d, 1H), 8.19 (s, 1H), 8.51 (d, 2H), 8.59 (s, 1H)	345
193		Et	1.28 (t, 3H), 2.20 (s, 3H), 2.33 (m, 4H), 3.45 (m, 4H), 4.37 (q, 2H), 7.13 (t, 1H), 7.39 (t, 1H), 7.45 (s, 2H), 7.52 (d, 1H), 8.00 (d, 1H), 8.13 (s, 1H), 8.47 (s, 1H)	337
194		Et	1.28 (t, 3H), 3.73 (s, 3H), 4.37 (q, 2H), 7.13 (t, 1H), 7.39 (m, 4H), 7.55 (dd, 2H), 8.05 (d, 1H), 8.13 (s, 1H), 8.23 (s, 1H), 8.41 (s, 1H), 8.51 (s, 1H)	360
195		Et	1.28 (t, 3H), 4.35 (m, 4H), 6.55 (t, 1H), 7.13 (t, 1H), 7.13 (m, 1H), 7.41 (m, 8H), 8.03 (d, 1H), 8.19 (s, 1H), 8.45 (s, 1H)	344
196		Et	1.28 (t, 3H), 2.95 (s, 3H), 4.39 (q, 4H), 4.57 (s, 2H), 7.13 (t, 1H), 7.40 (m, 9H), 8.03 (d, 1H), 8.19 (s, 1H), 8.41 (s, 1H)	358
197		Et	1.08 (t, 3H), 1.28 (t, 3H), 3.73 (q, 2H), 4.37 (q, 2H), 7.12 (t, 1H), 7.40 (m, 9H), 7.75 (s, 1H), 8.00 (d, 1H), 8.09 (s, 1H)	358

198		Et	1.28 (t, 3H), 2.83 (t, 2H), 2.95 (s, 3H), 3.55 (t, 2H), 4.39 (q, 2H), 7.13 (t, 1H), 7.20 (m, 1H), 7.29 (m, 4H), 7.40 (t, 1H), 7.45 (s, 2H), 7.53 (d, 1H), 8.03 (d, 1H), 8.12 (s, 1H), 8.19 (s, 1H)	372
199		Et	1.28 (t, 3H), 1.68 (m, 2H), 2.19 (s, 6H), 2.25 (t, 2H), 2.90 (s, 3H), 3.33 (t, 2H), 4.39 (q, 2H), 7.13 (t, 1H), 7.43 (m, 3H), 7.53 (d, 1H), 8.01 (d, 1H), 8.13 (s, 1H), 8.88 (s, 1H)	353
200		Et	1.28 (t, 3H), 4.39 (q, 2H), 6.95 (t, 1H), 7.12 (t, 1H), 7.27 (t, 2H), 7.47 (m, 7H), 8.07 (d, 1H), 8.23 (s, 1H), 8.57 (s, 1H), 8.61 (s, 1H)	330
201		Et	1.28 (t, 3H), 4.39 (q, 2H), 7.12 (m, 3H), 7.47 (m, 6H), 8.07 (d, 1H), 8.23 (s, 1H), 8.57 (s, 1H), 8.65 (s, 1H)	348
202		Et	1.28 (t, 3H), 3.49 (m, 2H), 4.03 (t, 2H), 4.37 (q, 2H), 6.31 (t, 1H), 6.93 (m, 3H), 7.13 (t, 1H), 7.28 (t, 2H), 7.43 (m, 4H), 8.03 (d, 1H), 8.17 (s, 1H), 8.48 (s, 1H)	374
203		Et	1.28 (t, 3H), 3.08 (s, 3H), 3.72 (t, 2H), 4.13 (t, 2H), 4.37 (q, 2H), 6.93 (m, 3H), 7.13 (t, 1H), 7.28 (t, 2H), 7.40 (t, 1H), 7.47 (s, 2H), 7.53 (d, 1H), 8.03 (d, 1H), 8.15 (s, 1H), 8.29 (s, 1H)	388
204		Et	1.28 (t, 3H), 3.29 (s, 3H), 4.37 (q, 2H), 7.12 (t, 1H), 7.23 (t, 1H), 7.40 (m, 7H), 7.53 (d, 1H), 8.00 (d, 1H), 8.09 (s, 1H), 8.13 (s, 1H)	344

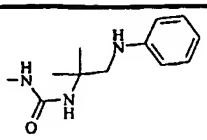
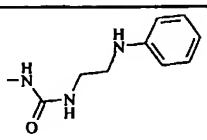
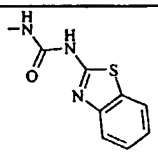
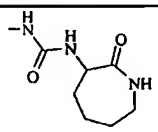
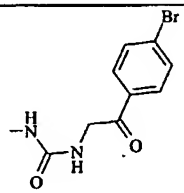
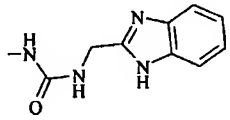
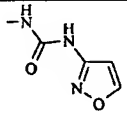
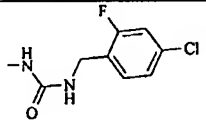
205		Et	1.13 (t, 3H), 1.28 (t, 3H), 3.49 (m, 2H), 3.72 (t, 2H), 4.13 (t, 2H), 4.37 (q, 2H), 6.93 (m, 3H), 7.13 (t, 1H), 7.28 (t, 2H), 7.40 (t, 1H), 7.47 (s, 2H), 7.53 (d, 1H), 8.03 (d, 1H), 8.15 (s, 1H), 8.29 (s, 1H)	402
206		Et	8.51 (s, 1H), 8.13 (s, 1H), 8.00 (d, 1H), 7.53 (d, 1H), 7.45 (s, 2H), 7.39 (m, 2H), 7.13 (t, 1H), 6.83 (s, 1H), 4.37 (q, 2H), 4.12 (m, 2H), 2.81 (m, 2H), 2.31 (m, 1H), 1.89 (m, 1H), 1.55 (m, 3H), 1.28 (t, 3H)	365
207		Et	9.33 (s, 1H), 8.12 (s, 1H), 8.00 (d, 1H), 7.53 (d, 1H), 7.43 (m, 3H), 7.13 (t, 1H), 4.37 (q, 2H), 3.39 (t, 2H), 3.28 (s, 1H), 2.88 (s, 3H), 2.49 (q, 2H), 2.32 (s, 3H), 1.69 (m, 2H), 1.28 (t, 3H)	339
208		Et	8.51 (s, 1H), 8.13 (s, 1H), 8.00 (d, 1H), 7.53 (d, 1H), 7.45 (s, 2H), 7.39 (t, 1H), 7.13 (t, 1H), 4.37 (q, 2H), 4.17 (m, 2H), 2.73 (m, 2H), 2.45 (m, 5H), 1.73 (m, 2H), 1.43 (m, 8H), 1.28 (t, 3H)	405
209		Et	8.19 (s, 1H), 8.13 (s, 1H), 8.00 (d, 1H), 7.48 (m, 4H), 7.13 (t, 1H), 4.63 (m, 1H), 4.37 (q, 2H), 3.60 (m, 2H), 3.33 (m, 2H), 3.36 (s, 3H), 2.01 (m, 2H), 1.43 (s, 9H), 1.28 (t, 3H)	437
210		Et	8.55 (s, 2H), 8.28 (s, 2H), 8.08 (d, 2H), 7.48 (m, 8H), 7.13 (t, 2H), 4.37 (q, 4H), 1.28 (t, 6H)	447

5

Ex	R^a	R^b	M/z
211 [6]		Et	414
212		Et	378
213		Et	334
214		Et	338
215		Et	413
216		Et	381
217		Et	345
218		Et	359
219		Et	427
220		Et	358

221		Et	292
222		Et	294
223		Et	367
224		Et	388
225		Et	370
226		Et	428
227		Et	430
228		Et	365
229		Et	391
230		Et	348

5

231 [7]		Et	401
232		Et	373
233		Et	387
234		Et	365
235		Et	450
236		Et	384
237		Et	321
238		Et	396

[1] Amine: Method 23

[2] Amine: Tetrahedron, 1992, 48(11), 1999.

[3] Amine: Method 20

[4] Amine: Tetrahedron, 1998, 54(10), 2181-2208

[5] Compound of (R) stereochemistry

[6] Amine: J Org Chem, 1962, 27, 3251-3

[7] Amine: J Am Chem Soc, 1946, 68, 14-18

Example 239

3-[4-(*N,N*-Dimethylaminomethyl)piperidin-1-ylcarbonylamino]-9-ethylcarbazole

To a stirred solution of 3-[4-(*N,N*-mesyloxymethyl)piperidin-1-ylcarbonylamino]-9-ethylcarbazole (Example 145; 250 mg, 0.58 mM) in DCM (10 ml) was added dimethylamine solution (33% in EtOH; 10 ml). The solution was heated at reflux for 18 hours before adding additional dimethylamine solution (33% in EtOH; 10 ml) and stirring for a further 18 hours. The reaction was then concentrated in vacuo. The crude solids were dissolved in DCM and washed twice with water before drying and concentrating in vacuo. These solids were purified by chromatography eluting with a MeOH/ DCM mixture. The desired product was isolated as a gum, yield 20 mg (9%). NMR 8.40 (s, 1H), 8.13 (s, 1H), 8.01 (d, 1H), 7.53 (d, 1H), 7.45 (s, 2H), 7.40 (t, 1H), 7.13 (t, 1H), 4.37 (q, 2H), 4.13 (d, 2H), 2.79 (t, 2H), 2.13 (m, 8H), 1.71 (m, 3H), 1.28 (t, 3H), 1.03 (m, 2H); m/z 379.

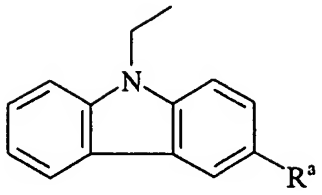
Example 240

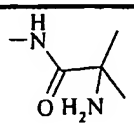
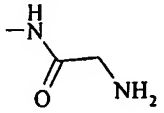
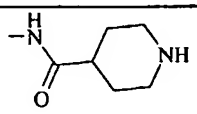
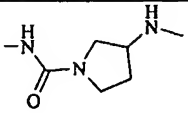
3-(3-Methoxy-2-aminopropionamido)-9-ethylcarbazole

Trifluoroacetic acid (1.0 ml) was added to a solution of 3-(3-methoxy-2-*t*-butyloxycarbonylaminopropionamido)-9-ethylcarbazole (Example 52; 0.5 g) in DCM (10 ml) at room temperature. The dark mixture was stirred overnight at room temperature. The mixture was diluted with DCM (25 ml) and washed with aqueous sodium hydroxide (1 M, 20 ml). The organic layer was washed with brine (25 ml), dried and evaporated *in vacuo* to leave a brown oil. The crude product was purified by flash chromatography eluting with DCM/2%MeOH to leave the product as a brown oil. The amine was dissolved in EtOAc (10 ml) and a solution of HCl (2 M) in EtOAc (5 ml) was added. The solution was evaporated *in vacuo* and the residue triturated with ether (10 ml) to leave a grey solid. NMR 10.75 (s, 1H), 8.4 (brs, 4H), 8.05 (d, 1H), 7.65-7.55 (m, 3H), 7.45 (t, 1H), 7.2 (t, 1H), 4.4 (q, 2H), 4.25 (brs, 1H), 3.8 (d, 2H), 3.3 (s, 3H), 1.3 (t, 3H); m/z 312.

Examples 241-244

The following compounds were prepared by the procedure of Example 240 using the appropriate starting materials.



Ex	R^a	NMR	M/z	SM
241		10.0 (s, 1H), 8.35-8.2 (m, 4H), 8.05 (d, 1H), 7.65-7.55 (m, 3H), 7.45 (t, 1H), 7.2 (t, 1H), 4.4 (q, 2H), 1.6 (s, 6H), 1.3 (t, 3H)	296	Ex 124
242		10.47 (s, 1H), 8.39 (s, 1H), 8.15 (s, 3H), 8.06 (d, 1H), 7.60 (m, 3H), 7.46 (t, 1H), 7.18 (t, 1H), 4.43 (q, 2H), 3.82 (s, 2H), 1.29 (t, 3H)	268	Ex 25
243		10.12 (s, 1H), 8.61 (bs, 1H), 8.50 (s, 1H), 8.10 (d, 1H), 7.62 (m, 3H), 7.50 (t, 1H), 7.22 (t, 1H), 4.45 (q, 2H), 3.45 (m, 2H), 3.02 (t, 2H), 2.93 (m, 1H), 2.07 (m, 2H), 1.95 (m, 2H). 1.34 (t, 3H)	322	Ex 82
244		9.29 (s, 2H), 8.31 (s, 1H), 8.13 (s, 1H), 8.00 (d, 1H), 7.48 (m, 4H), 7.13 (t, 1H), 4.37 (q, 2H), 3.60 (m, 5H), 2.57 (m, 3H), 2.23 (m, 2H), 1.28 (t, 3H)	337	Ex 209

Example 245

3-(2-Hydroxy-2-methylpropionamido)-9-ethylcarbazole

Sodium hydroxide (0.19 g, 4.8 mmol) was added to a solution of 3-(2-acetoxy-2-methylpropionamido)-9-ethylcarbazole (Example 136; 0.47 g, 1.4 mmol) in MeOH (10 ml) and water (5 ml). The solution was stirred at room temperature overnight. The solvent was removed *in vacuo* and the residue shaken with HCl (1 M, 4.8 ml, 4.8 mmol) and extracted with DCM (25 ml). The organic layer was separated, washed with brine (25 ml), dried and evaporated *in vacuo* to leave a light brown solid. The crude product was recrystallized from aqueous EtOH to leave the product as a light brown microcrystalline solid. NMR 9.5 (s, 1H),

8.5 (d, 1H), 8.05 (d, 1H), 7.7 (dd, 1H), 7.55 (d, 1H), 7.5 (d, 1H), 7.4 (t, 1H), 7.2 (t, 1H), 5.7 (s, 1H), 4.4 (q, 2H), 1.4 (s, 6H), 1.3 (t, 3H); m/z 297.

Example 246

3-(4-Phenoxymethylpiperidin-1-ylcarbonylamino)-9-ethylcarbazole

To a solution of 3-[4-(mesyloxymethyl)piperidin-1-ylcarbonylamino]-9-ethylcarbazole (Example 145; 250 mg, 0.58 mM) and phenol (120 mg, 1.28 mM) in DMF (10 ml) was added potassium carbonate (176 mg, 1.28 mM). The slurry was stirred for 18 hours before concentrating in vacuo. The residue was dissolved in DCM and washed twice with water, then saturated sodium hydrogen carbonate before drying and concentrating to afford a crude solid. This was chromatographed eluting with EtOAc/ isohexane mixtures. A gum was afforded, yield 50 mg (20%). NMR 8.45 (s, 1H), 8.13 (s, 1H), 8.01 (d, 1H), 7.53 (d, 1H), 7.45 (s, 2H), 7.40 (t, 1H), 7.27 (t, 2H), 7.13 (t, 1H), 6.93 (m, 3H), 4.37 (q, 2H), 4.19 (d, 2H), 3.85 (d, 2H), 2.93 (t, 2H), 1.99 (brs, 1H), 1.81 (d, 2H), 1.28 (m, 6H); m/z 428.

Example 247

3-(4-Phenoxyethylpyrrolidin-1-ylcarbonylamino)-9-ethylcarbazole

This title compound was produced as a by-product of Example 246 and was purified by flash chromatography from the same reaction mixture. NMR 8.17 (s, 1H), 8.07 (s, 1H), 8.01 (d, 1H), 7.45 (m, 4H), 7.27 (t, 2H), 7.13 (t, 1H), 6.93 (m, 3H), 4.37 (q, 2H), 4.03 (t, 2H), 3.68 (m, 1H), 3.56 (m, 1H), 3.35 (m, 1H), 3.05 (t, 1H), 2.36 (m, 1H), 2.08 (brs, 1H), 1.85 (q, 2H), 1.64 (m, 1H), 1.28 (m, 6H); m/z 428.

Example 248

3-(Pyrid-2-ylamino)-9-ethylcarbazole

9-Ethyl-3-aminocarbazole (Reference Example 15; 456 mg, 2.17 mM) was dissolved in 2-fluoropyridine (2 ml) and heated to 120°C for 18 hours under an inert atmosphere. On cooling the mixture was diluted with DCM, washed with aqueous potassium carbonate solution, dried over sodium sulphate and concentrated. Chromatography (eluent gradient of hexane to EtOAc) gave the title compound as a pale brown solid (433 mg, 70%). Rf (MeOH:DCM -1:19) 0.40; NMR 8.87 (1H, m), 8.41 (1H, d), 8.15 (1H, dd), 8.06 (1H, d), 7.63-

7.45 (4H, m), 7.42 (1H, t), 7.15 (1H, t), 6.79 (1H, d), 6.67 (1H, dd), 4.02 (2H, q), 1.32 (3H, t); m/z 288.47.

Example 249

3-(Benzimidazol-2-ylamino)-9-ethylcarbazole

A mixture of 9-ethyl-3-isothiocyanatocarbazole (Method 34; 378 mg, 1.5 mmol), 1,2-phenylenediamine (216 mg, 2.0 mmol) and yellow mercuric oxide (432 mg, 2.0 mmol) in EtOH (10 ml) was stirred for 8 hours under reflux in an argon atmosphere and allowed to cool overnight. The mixture was partitioned between EtOAc and water, and the organic phase was separated and washed with brine, dried and evaporated to dryness. The crude product was chromatographed, eluting with 0-6% EtOH in DCM to yield the title compound (129 mg) as a grey solid. NMR 10.84 (1H, brs), 9.20 (1H, s), 8.44 (1H, d), 8.07 (1H, dd), 7.72 (1H, dd), 7.55 (2H, d), 7.41 (1 H, dd), 7.30 (1H, brd), 7.24 (1H, brd), 7.15 (1H, dd), 6.95 (2H, brdd), 4.40 (2H, q), 1.31 (3H, t); m/z 327.

Example 250

3-(6-Methylpyridazin-3-ylamino)-9-ethylcarbazole

Example 251

3-[*N,N*-Di-(6-methylpyridazin-3-yl)amino]-9-ethylcarbazole

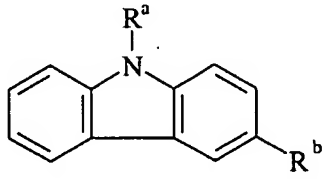
9-Ethyl-3-aminocarbazole (Reference Example 15; 4.52 g, 21.48 mM), 3-chloro-6-methylpyridazine (2.76 g, 21.48 mM), S-2,2'-bis(diphenylphosphino)-1,1'-binaphthyl (535 mg, 0.86 mM) and tris(dibenzylideneacetone)dipalladium(0) (394 mg, 0.43 mM) were added to sodium *t*-butoxide (2.89 g, 30.07 mM) in toluene (10 ml) under an inert atmosphere and heated to 80°C for 18 hours. On cooling, the mixture was diluted with DCM, washed with aqueous potassium carbonate solution, dried over sodium sulphate and concentrated. Chromatography (eluent gradient of hexane to EtOAc then MeOH) gave a mixture of the title compounds.

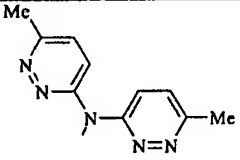
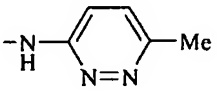
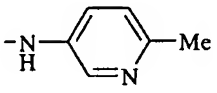
3-(6-Methylpyridazin-3-ylamino)-9-ethylcarbazole: Yield 2.20 g (34%); Rf (EtOAc) 0.13; NMR ($CDCl_3$) 8.04 (1H, d), 8.00 (1H, d), 7.53-7.33 (4H, m), 7.27 (1H, d), 7.22 (1H, t), 7.02 (1H, t), 6.99 (1H, brs), 6.90 (1H, d), 4.39 (2H, q), 2.58 (3H, s), 1.45 (3H, t); m/z 303.30.

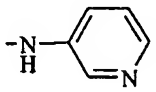
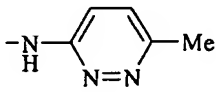
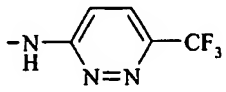
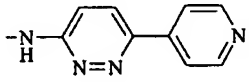
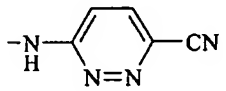
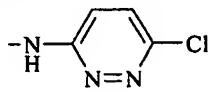
3-[*N,N*-Di-(6-methylpyridazin-3-yl)amino]-9-ethylcarbazole: Yield 301 mg (4%); Rf (MeOH:DCM- 1:9) 0.40; NMR 8.13 (1H, d), 8.09 (1H, d), 7.69 (1H, d), 7.63 (1H, d), 7.46 (1H, t), 7.42 (2H, d), 7.28 (1H, d), 7.26 (1H, d), 7.15 (1H, t), 4.48 (2H, q), 2.52 (6H, s), 1.34 (3H, t); m/z 395.34.

Examples 252 - 260

The following compounds were prepared by the procedure of Example 250 using the appropriate starting materials.



Ex	R^a	R^b	NMR	M/z	SM
252	i-Pr		8.12 (1H, d), 8.09 (1H, d), 7.89 (1H, d), 7.74 (1H, d), 7.44 (1H, t), 7.43 (2H, d), 7.31 (2H, d), 7.26 (1H, dd), 7.13 (1H, t), 5.15 (1H, septet), 2.52 (3H, s), 1.66 (6H, d)	409.53	Ex 8 and [1]
253	i-Pr		9.04 (1H, brs), 8.49 (1H, d), 8.05 (1H, d), 7.70-7.50 (3H, m), 7.39 (1H, t), 7.27 (1H, d), 7.13 (1H, t), 5.06 (1H, septet), 2.46 (3H, s), 1.63 (6H, d)	317.39	Ex 8 and [1]
254	Et		9.16 (1H, brs), 8.13 (1H, d), 8.05 (2H, m), 7.90 (1H, dd), 7.70-7.53 (3H, m), 7.43 (1H, t), 7.32 (1H, dd), 7.17 (1H, t), 4.45 (2H, q), 2.58 (3H, s), 1.30 (3H, t)	302.37	Ref Ex 15 and [2]

255	Et		9.42 (1H, brs), 8.26 (1H, d), 8.20-8.05 (3H, m), 7.94 (1H, dd), 7.77 (1H, dd), 7.68 (1H, d), 7.62 (1H, d), 7.46 (1H, t), 7.36 (1H, dd), 7.18 (1H, t), 4.46 (2H, q), 1.32 (3H, t)	288.36	Ref Ex 15 and [3]
256	CF_3CH_2-		($CDCl_3$) 8.06 (2H, m), 7.53 (1H, t), 7.42 (3H, m), 7.29 (1H, t), 7.09 (1H, d), 7.02 (1H, brs), 6.93 (1H, d), 4.81 (2H, q), 2.60 (3H, s)	357.39	Ex 7 and [1]
257	Et		($CDCl_3$) 8.05 (d, 2H), 7.65 (s, 1H), 7.35-7.6 (m, 5H), 7.25 (t, 1H), 6.95 (d, 1H), 4.4 (q, 2H), 1.5 (t, 3H)	357	Ref Ex 15 and [4]
258	Et		($CDCl_3$) 8.7 (d, 2H), 8.1 (d, 2H), 7.9 (dd, 2H), 7.65 (d, 1H), 7.5 (m, 1H), 7.45 (m, 4H), 7.25 (m, 1H), 7.05 (d, 1H), 4.4 (q, 2H), 1.5 (t, 3H)	366	Ref Ex 15 and [5]
259	Et		($CDCl_3$) 8.00 (d, 1H), 7.95 (d, 1H), 7.75 (m, 1H), 7.3-7.5 (m, 5H), 6.8 (d, 1H), 4.35 (q, 2H), 1.4 (t, 3H)	314	Ref Ex 15 and [6]
260	Et		($CDCl_3$): 8.05 (d, 1H), 8.0 (d, 1H), 7.5 (dd, 1H), 7.4 (dd, 2H), 7.35 (m, 1H), 7.25 (m, 1H), 7.15 (d, 1H), 6.9 (d, 1H), 4.4 (q, 2H), 1.3 (t, 3H)	323	Ref Ex 15 and [7]

[1] 3-Chloro-6-methylpyridazine

[2] 3-Bromo-6-methylpyridine

[3] 3-Bromopyridine

[4] 3-Chloro-6-trifluoromethylpyridazine (Tetrahedron, 1999, 55, 15067-70)

[5] 3-Chloro-6-pyrid-4-ylpyridazine (US 4590194)

[6] 3-Chloro-6-cyanopyridazine (Eur J Med Chem, 1984, 19, 111-117)

[7] 3,6-dichloropyridazine

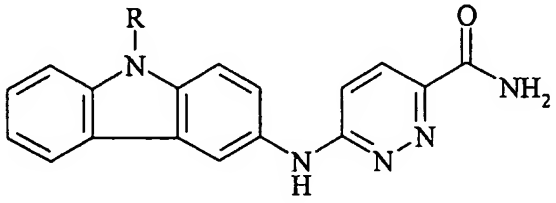
Example 261

3-(6-Carbamoylpyridazin-3-ylamino)-9-ethylcarbazole

9-Ethyl-3-aminocarbazole (Reference Example 15; 683 mg, 3.25 mM) and 3-chloro-6-carbamoylpyridazine (512 mg, 3.25 mM) were dissolved in DMF (7 ml) and heated to 110°C for 18 hours. On cooling the mixture was poured onto water and the resultant solid isolated. The solid was chromatographed (eluent gradient of DCM to EtOAc then MeOH) to give the title compound as an off white solid. Yield 184 mg (17%). Rf (EtOAc) 0.20; NMR 9.68 (1H, brs), 8.54 (1H, d), 8.24 (1H, brs), 8.07 (1H, d), 7.92 (1H, d), 7.70-7.50 (4H, m), 7.46 (1H, t), 7.25-7.10 (2H, m), 4.40 (2H, q), 1.30 (3H, t); m/z 332.34.

Examples 262 - 263

The following compounds were prepared by the procedure of Example 261 using the appropriate starting materials.



Ex	R	NMR	M/z	SM
262	CF_3CH_2-	9.70 (1H, s), 8.59 (1H, d), 8.24 (1H, brs), 8.09 (1H, d), 7.91 (1H, d), 7.80-7.60 (3H, m), 7.55 (1H, brs), 7.48 (1H, t), 7.25 (1H, t), 7.20 (1H, d), 5.40 (2H, q)	386.33	Ex 7

263	*i*-Pr	9.68 (1H, brs), 8.55 (1H, d), 8.25 (1H, brs), 8.06 (1H, d), 7.89 (1H, d), 7.75-7.55 (3H, m), 7.54 (1H, brs), 7.40 (1H, t), 7.20-7.10 (2H, m), 5.08 (1h, septet), 1.63 (6H, d)	346.38	Ex 8

Example 264

N^2-Cyano-N^1-(9-ethylcarbazol-3-yl)methylthiocarboxamidine

To a solution of dimethyl *N*-cyanodithioiminocarbonate (10.42 g, 71.4 mmol) in EtOH (100 ml) at room temperature was slowly added a solution of 3-amino-9-ethylcarbazole (Reference Example 15; 5.0 g, 23.8 mmol) in EtOH (100 ml). After being heated at reflux for 72 hours the reaction mixture was concentrated and absorbed onto silica. Chromatography (eluent 30% EtOAc / isohexane - 10% MeOH/ EtOAc) yielded the title compound as a brown solid (3.822 g, 52%). Rf (50% EtOAc /isohexane) 0.52; NMR 10.30 (s, 1H), 8.20 (m, 2H), 7.60 (m, 2H), 7.45 (m, 2H), 7.20 (t, 1H), 4.45 (q, 2H), 2.65 (s, 3H), 1.3 (t, 3H); m/z 309.5.

Example 265

N^2-Cyano-N^1-(9-ethylcarbazol-3-yl)morpholinocarboxamidine

A mixture of N^2-cyano-N^1-(9-ethylcarbazol-3-yl)methylthiocarboxamidine (Example 264; 268 mg, 0.87 mmol), silver nitrate (170 mg, 1 mmol), morpholine (0.08 ml, 0.9 mmol) and triethylamine (4 ml) in dry DMF (6 ml) was stirred at room temperature for 20 hours. The reaction mixture was concentrated and azeotroped with toluene before being absorbed onto silica. Chromatography on a Bond Elut column (20 g) (Eluent - EtOAc) yielded the title compound as a brown solid. Rf (EtOAc) 0.33; NMR ($CDCl_3$) 8.05 (d, 1H), 7.80 (s, 1H), 7.55 (m, 1H), 7.45 (m, 1H), 7.40 (m, 1H), 7.15 (dd, 1H), 7.10 (s, 1H), 4.40 (q, 2H), 3.60 (m, 4H), 3.40 (m, 4H), 1.45 (t, 3H); m/z 348.5.

Example 266

3-(Succinimid-1-yl)-9-ethylcarbazole

The title compound was isolated as a by-product in the synthesis of Example 66. NMR 8.1 (d, 1H), 8.0 (d, 1H), 7.7 (d, 1H), 7.65 (d, 1H), 7.5 (t, 1H), 7.25 (dd, 1H), 7.2 (t, 1H), 4.5 (q, 2H), 2.8 (s, 4H), 1.3 (t, 3H); m/z 293.

Example 267

2-Methyl-3-(*t*-butylcarbonylamino)-9-ethylcarbazole

Example 268

1-Methyl-3-(*t*-butylcarbonylamino)-9-ethylcarbazole

A solution of 3-(*t*-butylcarbonylamino)-9-ethylcarbazole (Example 139; 1.18 g, 4.0 mmol) in dry THF (15 ml) was cooled to -30°C under a stream of argon. 1.7 M *tert*-butyllithium in pentane (5.15 ml, 8.8 mmol) was added cautiously to the stirred mixture over a period of 10 minutes, the mixture was allowed to warm to 0°C over a period of 30 minutes and then re-cooled to -30°C. Iodomethane (596 mg, 4.2 mmol) was added slowly, the mixture stirred for 3 hours at ambient temperature then reduced *in vacuo*. The residue was chromatographed (eluent 1 : 3 EtOAc in isohexane) to give the title compounds.
Example 267: (214 mg). NMR 8.94 (s, 1H), 8.05 (d, 1H), 7.84 (s, 1H), 7.54 (d, 1H), 7.43 (s, 1H), 7.38 (t, 1H), 7.12 (t, 1H), 4.38 (q, 2H), 2.31 (s, 3H), 1.27 (m, 12H); m/z 309.
Example 268: (8.7 mg). NMR 9.12 (s, 1H), 8.19 (s, 1H), 7.78 (d, 1H), 7.54 (d, 1H), 7.39 (t, 1H), 7.33 (t, 1H), 7.14 (t, 1H), 4.55 (q, 2H), 2.73 (s, 3H), 1.29 (t, 3H) 1.23 (s, 9H); m/z 309.

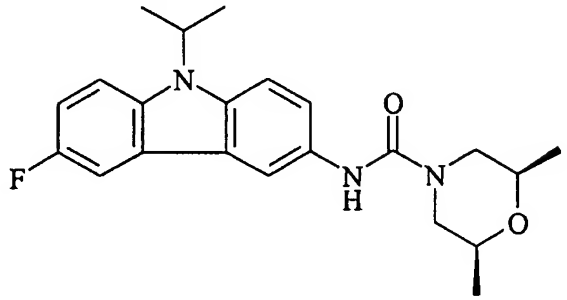
Example 269

6-Fluoro-9-isopropyl-3-(morpholinocarbonylamino)carbazole

Triethylamine (139 µl, 1 mmol) was added to a stirred suspension of 6-fluoro-9-isopropyl-3-carboxycarbazole (Method 36; 271 mg, 1 mmol) and diphenylphosphorylazide (275 mg, 1.1 mmol) in dry toluene (15 ml) under argon. The resultant solution was stirred at ambient temperature for one hour then heated to reflux for one hour. The heat source was removed and morpholine (200 µl, 3 mmol) was added and the resultant solution stirred overnight at ambient temperature. The mixture was filtered, the filtrate diluted with EtOAc (30 ml) and washed with water (10 ml), 1M HCl (10 ml), 0.2M NaOH (10 ml), water (10 ml), saturated brine (10 ml), dried and evaporated to dryness under reduced pressure. The resultant gum was purified using a Bond Elut column (20 g) eluting with 0.5% MeOH/DCM to give the title compound (259 mg) as a white solid. NMR ($CDCl_3$) 1.6 (t, 6H), 3.5 (t, 4H), 3.7 (t, 4H), 4.9 (m, 1H), 7.1 (t, 1H), 7.2-7.4(m, 3H), 7.6 (d, 1H), 8.0 (s, 1H); m/z 356.

Example 270

The following compound was prepared by the procedure of Example 269 using the appropriate morpholine starting material.



Ex	NMR	M/z
270	($CDCl_3$) 1.2 (d, 6H), 1.6 (d, 6H), 2.6 (t, 2H), 3.7 (m, 2H), 3.9 (d, 2H), 4.9 (m, 1H), 6.4 (s, 1H), 7.1 (t, 1H), 7.3-7.5 (m, 3H), 7.6 (d, 1H), 8.0 (s, 1H)	384

Example 271

6-Fluoro-9-isopropyl-3-ethoxycarbonylcarbazole

6-Fluoro-3-ethoxycarbonylcarbazole (Example 272) was alkylated with 2-bromopropane by the procedure of Method 12. NMR ($CDCl_3$) 1.4 (t, 3H), 1.7 (d, 6H), 4.5 (q, 2H), 5.0 (m, 1H), 7.2 (t, 1H), 7.4 (d, 1H), 7.5 (d, 1H), 7.8 (d, 1H), 8.2 (d, 1H), 8.8 (s, 1H); m/z 300.

Example 272

6-Fluoro-3-ethoxycarbonylcarbazole

6-Fluoro-3-ethoxycarbonyl-1,2,3,4-tetrahydrocarbazole (Method 37; 3.13 g, 12 mmol) in xylene was treated with 2,3-dichloro-5,6-dicyano-1,4-benzoquinone (6.45 g, 26 mmol) and the mixture was heated under reflux for 4 hours, cooled to ambient temperature, filtered through diatomaceous and the filtrate loaded on to a Bond Elut column (20 g) and eluted with 5% EtOAc/toluene then recrystallized from EtOAc/hexane to give the title compound (2.35g). NMR ($CDCl_3$) 1.5 (t, 3H), 4.4 (t, 2H), 7.2 (t, 1H), 7.3 (m, 1H), 7.4 (d, 1H), 7.8 (d, 1H), 8.2 (d, 1H), 8.3 (b, 1H), 8.8 (s, 1H); m/z 258.

Reference Examples

The following compounds are provided as a further feature of the invention and are known in the art. However, their use as agonists or antagonists at the neuropeptide Y5 receptor is not known in the art. Synthetic procedures to these compounds are included by reference.

Ref Ex	Compound	Source
1	3-Benzoylamino-9-ethylcarbazole	Kysiol J.B. et.al, Pol. J. Chem., 1981, 55 (4), 937-40
2	3-Acetamido-9-ethylcarbazole	Salor
3	3-[(4-Methylphenoxy)methylcarbonyl-amino]-9-ethylcarbazole	Chembridge
4	3-Ethoxycarbonylamino-9-ethylcarbazole	Lancelot J.L. et. Al., 1981, 18 (7), 1281-5
5	3-Benzyloxycarbonylamino-9-ethylcarbazole	WO 9903846
6	3-Phenoxycarbonylamino-9-ethylcarbazole	JP 11109547, EP 829753
7	3-(3,4-Dichlorobenzoylamino)-9-ethylcarbazole	Specs
8	3-(4-Pyrid-2-ylpiperazin-1-ylmethyl)-9-ethylcarbazole	Fanwood
9	3-(4-Indol-3-ylethylaminomethyl)-9-ethylcarbazole	Specs
10	3-(1-Methylpiperidin-4-yl(*N*-methyl)aminomethyl)-9-ethylcarbazole	Chembridge
11	3-(Benzimidazol-2-yl)-9-ethylcarbazole	Berghot M.A. et. Al., Rev. Roum. Chim., 1995, 40 (4), 377-86
12	3-Maleimido-9-ethylcarbazole	Maybridge

13	3-Acetamido-9-acetylcarbazole	Tabka T. et. Al., Eur. J. Med. Chem., 1988, 23 (2), 119-24.
14	3-Acetamido-2-nitro-9-acetylcarbazole	Tabka T. et. Al., Eur. J. Med. Chem., 1988, 23 (2), 119-24
15	3-Amino-9-ethylcarbazole	Aldrich
16	9-Ethylcarbazole	Aldrich
17	9-Pyrrolidin-1-ylmethylcarbazole	Katritsky A.R. et.al., J.Org. Chem., 1988, 53 (4), 794-9
18	3-Amino-6-bromo-9-ethylcarbazole	DE 3444886

Preparation of Starting Materials

The starting materials for the Examples above are either commercially available or are readily prepared by standard methods from known materials. For example the following reactions are illustrations but not limitations of the preparation of some of the starting materials used in the above reactions.

Method 1

Ethyl (E)-3-pyridin-4-ylprop-2-enoate

To a solution of 4-pyridinecarboxaldehyde (67 ml, 700 mmol) and triethyl phosphono acetate (152 ml, 770 mmol) in THF (200 ml) at room temperature was added lithium hydroxide (32.4 g, 770 mmol). After 18 hours ether (500 ml) was added, washed with sodium hydrogen carbonate, brine and concentrated to give a white solid. Yield 102.1 g (83%). NMR 8.62 (d, 2H), 7.60 (d, 1H), 7.35 (d, 2H), 6.59 (d, 1H), 4.30 (q, 2H), 1.35 (t, 3H); m/z 178.3.

Method 2

Ethyl 3-pyridin-4-ylpropanoate

Ethyl (E)-3-pyridin-4-ylprop-2-enoate (Method 1; 102.3 g, 576 mmol) in MeOH (300 ml) was hydrogenated using palladium on carbon 5% (9.0 g) under atmospheric pressure hydrogen for 72 hours. Catalyst was filtered off through diatomaceous earth and the filtrate concentrated to give a yellow oil. Yield 103.1 g (99%). NMR ($CDCl_3$) 8.50 (d, 2H), 7.15 (d, 2H), 4.12 (q, 2H), 2.95 (t, 2H), 2.64 (t, 2H), 1.21 (t, 3H); m/z 180.4.

Method 3

3-Pyridin-4-ylpropanoic acid

To a solution of ethyl 3-pyridin-4-ylpropanoate (Method 2; 103.1 g, 576 mmol) in water (400 ml) and EtOH (20 ml) at room temperature was added potassium hydroxide (60 g, 1600 mmol). After 18 hours hydrochloric acid (100 ml) was added to give a white solid. Yield 62.8 g (73%). NMR 8.38 (d, 2H), 7.21 (d, 2H), 2.70 (t, 2H), 2.52 (t, 2H); m/z 152.2.

Method 4

Ethyl (E)-2-methyl-3-pyridin-4-ylprop-2-enoate

To a solution of 4-pyridinecarboxaldehyde (9 ml, 93 mmol) and triethyl 2-phosphonopropianoate (22 ml, 102 mmol) in THF (50 ml) at room temperature was added lithium hydroxide (4.3 g, 102 mmol). After 18 hours ether (100 ml) was added, washed with sodium hydrogen carbonate, brine and concentrated to give a white solid. 7.6 g (43%). NMR ($CDCl_3$) 8.60 (d, 2H), 7.53 (s, 1H), 7.20 (d, 2H), 4.25 (q, 2H), 2.06 (s, 3H), 1.35 (t, 3H); m/z 191.7.

Method 5

(E)-2-Methyl-3-pyridin-4-ylprop-2-enoic acid

To a solution of ethyl (E) 2-methyl-3-pyridin-4-ylprop-2-enoate (Method 4; 3 g, 15.7 mmol) in water (20 ml) at room temperature was added potassium hydroxide (1.7 g, 30.4 mmol). After 18 hours hydrochloric acid (3.5 ml) was added to give a white solid. Yield 1.48 g (56%). NMR 8.60 (d, 2H), 7.49 (s, 1H), 7.40 (d, 2H), 1.99 (s, 3H); m/z (ES^-) 161.6 (MH^-).

Method 6

Ethyl 2-methyl-3-pyridin-4-ylpropanoate

Ethyl (E) 2-methyl-3-pyridin-4-ylprop-2-enoate (Method 4; 4.8 g, 25 mmol) in MeOH (300 ml) was hydrogenated using palladium on carbon 5% (500 mg) under atmospheric hydrogen at room temperature for 18 hours. The catalyst was filtered through diatomaceous earth and filtrate concentrated to give a yellow oil. Yield 4.2 g (88%). NMR ($CDCl_3$) 8.60 (d, 2H), 7.10 (d, 2H), 4.09 (q, 2H), 3.01 (m, 1H), 2.73 (m, 2H), 1.19 (m, 6H); m/z 193.8.

Method 7

2-Methyl-3-pyridin-4-ylpropanoic acid

To a solution of ethyl 2-methyl-3-pyridin-4-ylpropanate (Method 6; 3.8 g, 19.7 mmol) in water (20 ml) and EtOH (5 ml) at room temperature was added potassium hydroxide (2.3 g, 39.4 mmol). After 18 hours hydrochloric acid (3.5 ml) was added to give a white solid. Yield 1.84 g (56%). NMR ($CDCl_3$) 9.26 (brs, 1H), 8.46 (d, 2H), 7.21 (d, 2H), 3.06 (m, 1H), 2.76 (m, 2H), 1.24 (s, 3H); m/z 166.3.

Method 8

(E)-3-pyridin-4-ylprop-2-enoic acid

To a solution of ethyl (E)-3-pyridin-4-ylprop-2-enoate (Method 1; 2 g, 11.3 mmol) in water (20 ml) at room temperature was added potassium hydroxide (1.3 g, 22.6 mmol). After 18 hours hydrochloric acid (2 ml) was added to give a white solid. Yield 1.1 g (59%). NMR 8.60 (d, 2H), 7.61 (d, 2H), 7.55 (d, 1H), 6.75 (d, 1H); m/z 150.3.

Method 9

2-Methoxybenzamidoxime

A solution of 1-methoxybenzonitrile (1 g, 7.5 mmol), hydroxylamine hydrochloride (0.6 g, 8.6 mmol) and sodium carbonate (0.43 g, 4.1 mmol) in water (3 ml) and EtOH (15 ml) were heated at reflux for 22 hours. The mixture was concentrated and sodium carbonate solution added to give a white precipitate. Yield 0.41 g (33%). M. p. 122-123 °C.

Method 10

3-[3-(2-Methoxyphenyl)-1,2,4-oxadiazol-5-yl] propionic acid

A solution of 1-methoxybenzamidoxime (Method 9; 19 g, 115 mmol) and succinic anhydride (11.5 g, 115 mmol) in xylene (750 ml) were heated at reflux for 5 hours to give a white precipitate. Yield 23.5 g (65%). M. p. 133-133.5 °C; EA calc: $C_{12}H_{12}N_2O_3$: C. 58.06; H, 4.84; N, 11.29; found; C, 58.5; H, 4.8; N, 11.3.

Method 11

9-Ethyl-3-carboxycarbazole

To a solution of 9-ethyl-3-formylcarbazole (8.3 g, 37.2 mmol) in acetone (25 ml) was added potassium permanganate (12.1 g, 76.6 mmol) in water (50 ml) and the mixture heated at reflux for 18 hours. The mixture was filtered through diatomaceous earth and acidified with hydrochloric acid to give a white solid. Yield 7.7 g (87%). NMR 12.53 (s, 1H), 8.78 (s, 1H), 8.26 (d, 1H), 8.06 (d, 1H), 7.68 (d, 2H), 7.50 (t, 1H), 7.25 (t, 1H), 4.47 (q, 2H), 1.33 (t, 3H); m/z 240.4.

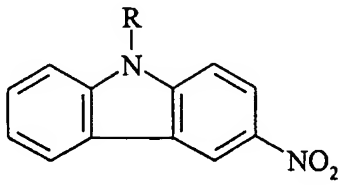
Method 12

2-Nitro-9-ethylcarbazole

2-Nitrocarbazole (Tet., 1984, 40(10), 1857-61; 3.00 g, 14.14 mM) was added to a suspension of sodium hydride (60% suspension in oil; 623 mg, 15.55 mM) in DMF (70 ml) at 0°C under an argon atmosphere. After 30 minutes ethyl iodide (1.25 ml, 15.55 mM) was added and the mixture allowed to warm to room temperature. After 18 hours water was added and the mixture extracted with EtOAc. The organic was washed with water and brine, dried over sodium sulphate and concentrated to give the title compound as a yellow solid. Rf (Z9) 0.36; NMR 8.34 (s, 1H), 8.16 (d, 1H), 8.13 (s, 2H), 7.60 (dd, 1H), 7.48 (d, 1H), 7.30 (d, 1H), 4.42 (q, 2H), 1.48 (t, 3H); m/z 241.3.

Methods 13 - 14

The following compounds were prepared by the procedure of Method 12 using 3-nitrocarbazole and the appropriate alkyl iodide.



Meth	R	NMR
13	*n*-Pr	9.13 (s, 1H), 8.34 (m, 2H), 7.78 (d, 1H), 7.72 (d, 1H), 7.55 (t, 1H), 7.32 (t, 1H), 4.43 (t, 2H), 1.81 (m, 2H), 0.86 (t, 3H)

14	*i*-Pr	9.16 (d, 1H), 8.40 (d, 1H), 8.28 (dd, 1H), 7.86 (d, 1H), 7.82 (d, 1H), 7.54 (t, 1H), 7.30 (t, 1H), 5.20 (sept, 1H), 1.62 (d, 6H)

Method 15

1-Chloro-4-(pyrid-4-ylmethyl)-phthalazine

A mixture of phthalic anhydride (20 g, 0.135 mol) and 4-methylpyridine (26.3 ml, 0.27 mol) was heated at 140°C for 22 hours. After cooling, the reaction mixture had solidified and the solid was ground and triturated with ether followed by acetone. A suspension of the resulting crude solid (30 g) in aqueous hydrazine (135 ml) was heated at 135°C for 14hrs. After cooling a precipitate was formed. The solid was filtered, washed with water and dried under vacuum to give 1-oxo-2H-4-(4-pyridylmethyl)-phthalazine (10.4 g).

A mixture of this material (4 g, 16.9 mmol), *N,N*-diethylaniline (2.7 ml), tetrabutylammonium chloride (9.4 g, 33.7 mmol) and phosphorous oxychloride (9.4 ml, 101 mmol) in acetonitrile (80 ml) was heated at 98°C for 2 hours. After removal of the volatiles under vacuum, the residue was poured onto a mixture of DCM (300 ml) and water/ice (900 ml). The mixture was maintained cold and the pH was adjusted to 4.7 with 2 M NaOH. The organic layer was separated and the aqueous layer was further extracted with DCM. The organic layers were combined, and washed with water, brine, dried and evaporated to dryness. The resulting solid was triturated with ether followed by EtOAc, filtered and dried under vacuum to give 2.6 g of solid. The product was purified by column chromatography eluting with DCM/MeOH 95/5.

Method 16

9-Mesyl-3-nitrocarbazole

To a solution of 3-nitrocarbazole (0.5 g, 2.4 mmol) in DMF (10 ml) at 0° C was added sodium hydride (110 mg, 2.7 mmol; as a 60% dispersion in mineral oil). After 30 minutes the mixture was added to methane sulphonyl chloride (0.21 ml, 2.7 mmol) in DMF (10 ml) at 0° C. After 4 hours water (50 ml) was added. The resulting precipitate was extracted (EtOAc), washed with sat. potassium carbonate solution, dried over sodium sulphate and evaporated to give a yellow solid. Yield 420 mg (61%). NMR 8.90 (s, 1H), 8.39 (m, 1H), 8.28 (m, 1H), 8.17 (d, 1H), 8.10 (d, 1H), 7.62 (t, 1H), 7.50 (m, 1H), 3.13 (s, 3H).

Method 17

9-Acetyl-3-nitrocarbazole

To a solution of 3-nitrocarbazole (4.1 g, 19.3 mmol) in DMF (100 ml) and triethylamine (3.4 ml) at 0°C was added acetyl chloride (1.7 ml, 21.2 mmol). After 4 hours water (400 ml) was added. The resulting precipitate was collected by filtration, washed with sat. potassium carbonate solution, dried, to give a yellow solid. Yield 3.7 g (59%). NMR ($CDCl_3$) 8.86 (s, 1H), 8.50 (m, 1H), 8.38 (m, 1H), 8.11 (t, 2H), 7.61 (t, 1H), 7.50 (t, 1H), 2.95 (s, 3H).

Method 18

N,N-Dimethylsulphamoyl-3-nitrocarbazole

To a solution of 3-nitrocarbazole (0.5 g, 2.4 mmol) in DMF (10 ml) at 0°C was added sodium hydride (110 mg, 2.7 mmol; as a 60% dispersion in mineral oil). After 30 minutes dimethyl sulphamoyl chloride (0.29 ml, 2.7 mmol) was added. After 2 hours water (50 ml) was added. The resulting precipitate was extracted (EtOAc), washed with water, dried over sodium sulphate and evaporated to give a yellow solid. Yield 480 mg (63%). NMR 8.90 (s, 1H), 8.39 (m, 1H), 8.28 (m, 1H), 8.17 (d, 1H), 8.10 (d, 1H), 7.62 (t, 1H), 7.50 (m, 1H), 3.13 (s, 3H).

Method 19

3-Formyl-6-nitro-9-ethylcarbazole

Fuming nitric acid (0.9 ml) was added to a cooled (ice-bath) solution of 9-ethyl-3-formylcarbazole (4.0 g, 17.9 mmol) in acetic anhydride (13 ml) and acetic acid (9 ml) maintaining the internal temperature below 10°C. The mixture was stirred in an ice-bath for 30 minutes. The mixture was poured onto crushed ice and water (50 ml). The precipitated solid was collected by filtration and washed with water to leave the product as a tan solid (12.7 g). NMR ($CDCl_3$) 10.1 (s, 1H), 9.05 (d, 1H), 8.65 (d, 1H), 8.4 (dd, 1H). 8.1 (d, 1H), 7.6 (d, 1H), 7.5 (d, 1H), 4.45 (q, 2H), 1.5 (t, 3H); m/z 269.

Method 20

3-Nitro-6-hydroxymethyl-9-ethylcarbazole

Sodium borohydride (0.071 g, 1.9 mmol) was added to a solution of 3-formyl-6-nitro-9-ethylcarbazole (Method 19; 0.5 g, 1.9 mmol) and water (1 ml) in THF (20 ml). The mixture was stirred at room temperature for 1 hour. The solvent was removed *in vacuo* and the residue partitioned between EtOAc and water. The organic layer was removed and washed with HCl (2 M), washed with water and dried. The solvent was removed *in vacuo* to leave a brown solid. NMR 9.1 (d, 1H), 8.35-8.25 (m, 2H), 7.75 (d, 2H), 7.7 (d, 1H), 7.5 (dd, 1H), 5.2 (brs, 1H), 4.7 (brs, 2H), 4.5 (q, 2H), 1.3 (t, 3H); m/z 271.

Method 21

4-(Mesyloxyethyl)-*N,N*-dimethylaniline

The title compound was prepared from 4-(2-hydroxyethyl)dimethylaniline in a similar manner as described for Example 141. NMR 7.15 (d, 2H), 6.85 (brs, 2H), 4.45 (t, 2H), 2.88 (m, 11H); m/z 244.

Method 22

4-(Methylaminoethyl)-*N,N*-dimethylaniline

To a stirred solution of 4-(mesyloxyethyl)-*N,N*-dimethylaniline (Method 21; 750 mg, 3.1 mM) in chloroform (10 ml) was added methylamine solution (33% in EtOH, 25 ml). The solution was stirred for 18 hours before concentrating in vacuo. The residue was dissolved in DCM and washed with water. The aqueous layer was concentrated in vacuo before chromatographing with MeOH/ DCM. A white solid was isolated, 293 mg (53%). NMR 7.05 (d, 2H), 6.68 (d, 2H), 3.29 (brs, 1H), 3.03 (t, 2H), 2.84 (s, 6H), 2.75 (t, 2H), 2.55 (s, 3H); m/z 179.

Method 23

3-Morpholino-1-(methylamino)propane

Methyl amine was bubbled into a solution of 3-morpholino-1-chloropropane (20 mmol) in absolute ethanol (30 ml) at ambient temperature for 10 min. The reaction mixture

was stirred during 1 hour and evaporated to give an oil which solidified. The solid was triturated with dry ether, filtered, washed with ether and dried under vacuum to give the title compound as a white solid (1.58g; 50%).

Method 24

1-Morpholino-2-carboxypropyl

1-Morpholino-2-methoxycarbonylpropyl (2.5 g, 13.4 mmol) and sodium hydroxide (1.0 g, 25 mmol) were dissolved in MeOH (30 ml) and water (15 ml) and the solution was stirred at room temperature for 18 hours. The solvent was removed *in vacuo* and the residue was dissolved in hydrochloric acid (1 M, 25 ml). The solvent was again removed *in vacuo* and the residue was triturated with MeOH (10 ml). The solid was removed by filtration and the filtrate was evaporated *in vacuo* to leave a light brown solid (2.0 g). M/z 174.

Method 25

1-Carboxymethylpyrrolidin-2-one

1-(Methoxycarbonylmethyl)pyrrolidin-2-one (2 g/1.77 ml, 12.73 mmol) was added to potassium hydroxide (87%, 2.46 g) and EtOH (35 ml) and the reaction was stirred for 3 days at room temperature. A solution of MeOH and hydrochloric acid was added until the pH of the solution was 2 and then the solvent was removed *in vacuo*. The resulting solid was stirred in EtOAc (150 ml) for 30 mins and then the solid was removed by filtration The solid was the stirred in boiling EtOAc for 1 hour, the suspension was allowed to cool and the solid was removed by filtration. The filtrates were combined and the solvent was removed *in vacuo* to yield a white solid (1.788 g, 98%). Mp 135-137°C.

Method 26

3-Nitro-9-(2,2,2-trifluoroethyl)carbazole

To a solution of 3-nitrocarbazole (4 g, 18.9 mmol) in dimethylacetamide (125 ml) at 0°C was added sodium hydride (0.85 g, 20.8 mmol; as a 60% dispersion in mineral oil). After 1 hour 2,2,2-trifluoroethyl-p-toluenesulfonate (5.03 g, 19.8 mmol) was added and the mixture was heated at reflux. After 18 hours water (300 ml) was added. The resulting precipitate was extracted (EtOAc), washed with water, dried (sodium sulphate), evaporated and purified by

chromatography (eluent 10% EtOAc; 90% isohexane) to give a yellow solid. Yield 2.3 g (41%). NMR 9.16 (s, 1H), 8.40 (m, 2H), 7.95 (d, 1H), 7.83 (d, 1H), 7.60 (t, 1H), 7.37 (t, 1H), 5.58 (q, 2H); m/z 295.4.

Method 27

2-Methyl-9-isopropyl-3-nitrocarbazole

To a stirred solution of 1,2,3,4-tetrahydro-9-isopropyl-7-methyl-6-nitrocarbazole (Method 28, 1.53 g, 5.62 mmol) in 1,4-dioxane at room temperature was added 2,3-dichloro-5,6-dicyano-1,4-benzoquinone (2.56 g, 11.24 mmol) portionwise. The reaction mixture was stirred at 100°C for 20h before being concentrated. Chromatography (eluent 10% EtOAc/isohexane) yielded the title compound as a yellow solid (947 mg, 63%). Rf (50% EtOAc/isohexane) 0.62; NMR 8.96 (s, 1H), 8.29 (d, 1H), 7.77 (d, 1H), 7.73 (s, 1H), 7.50 (t, 1H), 7.26 (t, 1H), 5.17 (sept, 1H), 2.76 (s, 3H), 1.63 (d, 6H).

Method 28

1,2,3,4-Tetrahydro-9-isopropyl-7-methyl-6-nitrocarbazole

Sodium hydride (454 mg, 11.34 mmol) was added slowly to a solution of 1,2,3,4-tetrahydro-7-methyl-6-nitrocarbazole (*Aust. J. Chem.*, 1969, **22**, 185-195; 1.74 g) in dry DMF at 0°C under an argon atmosphere. When no more gas was given off 2-bromopropane (1.06 ml, 11.34 mmol) was added and the reaction mixture was heated at 60°C for 20 hours before cooling. Further sodium hydride (1.21 g, 30.24 mmol) was added followed by 2-bromopropane (2.84 ml, 30.24 mmol) and the mixture was heated at 60°C for 4 hours. The reaction mixture was concentrated, diluted with water and extracted into EtOAc. The organic layers were separated and washed with water and brine and dried. Chromatography (eluent 25% EtOAc/isohexane) yielded the title compound as a yellow solid (1.53 g, 74%). Rf (ether) 0.71; NMR 8.13 (s, 1H), 7.52 (s, 1H), 4.68 (sept, 1H), 2.75 (m, 2H), 2.34 (m, 5H), 1.87 (m, 2H), 1.77 (m, 2H), 1.50 (d, 6H).

Method 29

2-Phenyl-5-(3-carboxypropyl)-1,3,4-oxadiazole

5-(N'-Benzoylhydrazino)-5-oxo-pentanoic acid (Method 30, 15.2 g) was added to stirred concentrated sulphuric acid (50 ml) at room temperature and the reaction mixture was stirred overnight. The reaction mixture was poured onto ice (200 g) and the mixture was stirred for 30 minutes. The resulting white precipitate was removed by filtration, washed with water and dried by suction. The residue was purified by recrystallization from 80-100 petrol to yield the title compound as a white solid. Mp 114-115°C.

Method 30

5-(N'-Benzoylhydrazino)-5-oxo-pentanoic acid

Benzoyl hydrazine (13.6 g) in hot EtOAc (100 ml) was added in 10 portions at 30 second intervals to a warm solution of glutaric anhydride (12.4 g) in EtOAc (100 ml). The solution was stirred for 30 minutes whilst cooling to room temperature. The resulting white solid was collected by filtration to give the title compound (20.7 g, 83%).

Method 31

3-Benzyl-5-(2-carboxyethyl)-1,2,4-oxadiazole

N-Hydroxy-2-phenylacetamidine (Method 32, 35 g) and succinic anhydride (23.4 g) were ground together and suspended in xylene (600 ml). The mixture was refluxed for five hours whilst removing water. The charred mixture was then refluxed in ether (500 ml) with decolourising charcoal before filtration. The filtrate was made alkaline by addition of ammonium hydroxide (2 M). The aqueous layer was then separated and acidified with hydrochloric acid (2 M) and extracted with ether. The ether layers were dried and evaporated to dryness to yield the title compound (4.0 g). This was recrystallized from toluene. Mp 58-60°C.

Method 32

N-Hydroxy-2-phenylacetamidine

Hydroxylamine hydrochloride (69.5 g) was dissolved in water (150 ml) and was added to sodium carbonate (52.5 g) in water (90 ml). Benzonitrile (100 g) in EtOH (600 ml) was

added and the mixture was refluxed with stirring for 20hours. It was then basified with sodium hydrogen carbonate solution (10%) and extracted with ether. The ether layers were combined and extracted with hydrochloric acid (2 M). The hydrochloric acid layers were basified with sodium carbonate and then extracted with ether. The ether layers were combined, dried and evaporated to dryness to give the title compound (108.0 g). This was recrystallized from EtOH. Mp 73-75°C.

Method 33

3-Bromo-5-(2-carboxyethyl)isoxazole

2-(2-Nitrovinyl)furan (13.5 g) in glacial acetic acid (125 ml) and hydrobromic acid (48%, 62.5 ml) was heated on a steam bath for 9 hours. The solution was concentrated *in vacuo* to 60 ml and was then diluted with water (60 ml). The reaction mixture was then boiled, treated with diatomaceous earth and charcoal and filtered hot before allowing to cool. The solution was extracted with chloroform (4x50 ml), dried and evaporated to dryness. The resultant gum was crystallised from benzene/cyclohexane, then carbon tetrachloride (carbon treated and filtered hot) and then toluene to give 2.5 g. Mp 108-110°C.

Method 34

9-Ethyl-3-isothiocyanatocarbazole

A solution of 3-amino-9-ethylcarbazole (Reference Example 15; 5.0 g, 23.8 mmol) in DCM (50 ml) was added over 1 hour to a stirred refluxing solution of thiophosgene (2.57 ml, 33.7 mmol) in DCM (40 ml). The reaction mixture was stirred for a further 18 hours under reflux, cooled and filtered. The filtrate was evaporated to dryness and the black residue was chromatographed, eluting with 10-50% EtOAc in isohexane, to give a yellow solid. Recrystallization from ether gave the title compound (2.74 g). NMR: 8.31 (1H, d), 8.18 (1H, d), 7.66 (1H, dd), 7.63 (1H, d), 7.50 (2H, m), 7.23 (1 H, dd), 4.44 (2H, q), 1.30 (3H, t).

Method 35

6-Cyano-3-nitro-9-ethylcarbazole

3-Formyl-6-nitro-9-ethylcarbazole (Method 19) was treated with hydroxylamine hydrochloride, p-toluene sulphonic acid and magnesium sulphate in xylene in the manner

described by Ganboa and Palomo in Synthetic Communications, 1983, 13, 219-223 to give the title compound. NMR (300 MHz, $CDCl_3$) 1.5 (t, 3H), 4.4 (q, 2H), 7.5 (m, 2H), 7.8 (s, 1H), 8.4 (m, 2H), 9.0 (s, 1H): m/z 266.

Method 36

6-Fluoro-9-isopropyl-3-carboxycarbazole

6-Fluoro-9-isopropyl-3-ethoxycarbonylcarbazole (Example 271; 1.46 g) was dissolved in THF : MeOH (3 : 1, 40 ml) and 1M lithium hydroxide (19 ml) was added and the solution was heated at 60°C for 1 hour. After cooling the organic solvents were removed under vacuum and the resultant aqueous solution was acidified to pH 1 with concentrated hydrochloric acid and the resultant precipitate filtered and dried to give the title compound (1.3 g). NMR 1.6 (d, 6H), 5.1 (m, 1H), 7.3 (t, 1H), 7.7 (m, 2H), 8.0 (d, 1H), 8.2 (d, 1H), 8.8 (s, 1H); m/z 272.

Method 37

6-Fluoro-3-ethoxycarbonyl-1,2,3,4-tetrahydrocarbazole

A stirred mixture of 4-fluorophenylhydrazine hydrochloride (4.4 g, 27 mmol) and ethyl-4-oxocyclohexanecarboxylate in ethanol (100 ml) was heated under reflux overnight. The solution was cooled in an ice bath and the resultant white crystals filtered off and washed with ice cold EtOH to give the title compound. NMR ($CDCl_3$) 1.3 (t, 3H), 1.9-2.1 (m, 1H), 2.3 (m, 1H), 2.7-2.9 (m, 4H), 3.0 (m, 1H), 4.2 (t, 2H), 6.8 (t, 1H), 7.0-7.2 (m, 2H), 7.7 (s, 1H); m/z 262.

Example 273

The following illustrate representative pharmaceutical dosage forms containing the compound of formula (I), or a pharmaceutically acceptable salt, prodrug or solvate thereof (hereafter compound X), for therapeutic or prophylactic use in humans:-

(a): Tablet I	mg/tablet
Compound X	100
Lactose Ph.Eur	182.75
Croscarmellose sodium	12.0
Maize starch paste (5% w/v paste)	2.25
Magnesium stearate	3.0

(b): Tablet II	mg/tablet
Compound X	50
Lactose Ph.Eur	223.75
Croscarmellose sodium	6.0
Maize starch	15.0
Polyvinylpyrrolidone (5% w/v paste)	2.25
Magnesium stearate	3.0

(c): Tablet III	mg/tablet
Compound X	1.0
Lactose Ph.Eur	93.25
Croscarmellose sodium	4.0
Maize starch paste (5% w/v paste)	0.75
Magnesium stearate	1.0

(d): Capsule	mg/capsule
Compound X	10
Lactose Ph.Eur	488.5
Magnesium stearate	1.5

5

(e): Injection I	**(50 mg/ml)**
Compound X	5.0% w/v
1M Sodium hydroxide solution	15.0% v/v
0.1M Hydrochloric acid	(to adjust pH to 7.6)
Polyethylene glycol 400	4.5% w/v
Water for injection	to 100%

(f): Injection II	**10 mg/ml**
Compound X	1.0% w/v
Sodium phosphate BP	3.6% w/v
0.1M Sodium hydroxide solution	15.0% v/v
Water for injection	to 100%

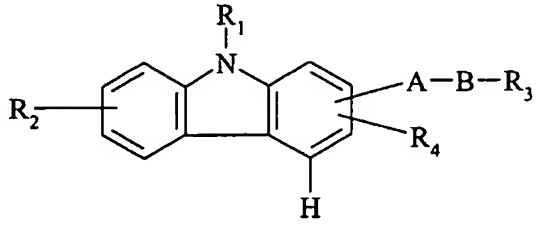
(g): Injection III	**(1mg/ml, buffered to pH6)**
Compound X	0.1% w/v
Sodium phosphate BP	2.26% w/v
Citric acid	0.38% w/v
Polyethylene glycol 400	3.5% w/v
Water for injection	to 100%

Note

The above formulations may be obtained by conventional procedures well known in the pharmaceutical art. The tablets (a)-(c) may be enteric coated by conventional means, for example to provide a coating of cellulose acetate phthalate.

CLAIMS

1. The use of a compound of formula (I) in the manufacture of a medicament for the treatment, in a warm-blooded animal, of disorders mediated by the neuropeptide Y5 receptor:



(I)

wherein:

$\mathbf{R_1}$ is selected from hydrogen, C_{1-6}alkyl, C_{1-4}alkoxyC_{1-4}alkyl, C_{1-6}alkanoyl, C_{1-4}alkanoylC_{1-4}alkyl, aryl, arylC_{1-4}alkyl, arylC_{1-4}alkoxyC_{1-4}alkyl, arylC_{1-4}alkanoyl, arylcarbonyl, heteroaryl, heteroarylC_{1-4}alkyl, heteroarylC_{1-4}alkoxyC_{1-4}alkyl, heteroarylC_{1-4}alkanoyl, heteroarylcarbonyl, heterocyclyl, heterocyclylC_{1-4}alkyl, heterocyclylC_{1-4}alkoxyC_{1-4}alkyl, heterocyclylC_{1-4}alkanoyl, heterocyclylcarbonyl, carbocyclyl, carbocyclylC_{1-4}alkyl, carbocyclylC_{1-4}alkoxyC_{1-4}alkyl, carbocyclylC_{1-4}alkanoyl, carbocyclylcarbonyl, C_{1-4}alkylsulphonyl, *N,N*-di-C_{1-4}alkylaminosulphonyl or *N*-C_{1-4}alkylaminosulphonyl wherein R_1 may be optionally substituted (on an available carbon atom) by up to three substituents independently selected from C_{1-4}alkyl optionally substituted by up to three fluoro substituents, C_{1-4}alkoxy, C_{1-4}alkanoyl, carboxy, hydroxy, halo, cyano, amino, *N*-C_{1-4}alkylamino, *N,N*-di-C_{1-4}alkylamino, C_{1-4}alkanoylamino, mercapto, C_{1-4}alkylsulphonyl, C_{1-4}alkylsulphinyl, C_{1-4}alkylsulphanyl, nitro, heteroarylC_{1-4}alkanoylamino, or C_{1-4}alkoxycarbonyl;

$\mathbf{R_2}$ is selected from hydrogen, C_{1-4}alkyl (optionally substituted by hydroxy), C_{1-4}alkoxy, cyano, nitro, halo, amino, *N*-C_{1-4}alkylamino, or *N,N*-di-C_{1-4}alkylamino;

A is selected from, -NH-, -CH_2NH-, -NHC(O)-, -CH_2NHC(O)-, -C(O)NH-, -NHC(O)NH-, -NHC(O)O-, -NHS(O_2)-, -NHC(=N-CN)-, or a direct bond; wherein each nitrogen atom is optionally substituted with C_{1-4}alkyl or hydroxyC_{2-4}alkyl;

B is selected from C_{1-10}alkylene, C_{2-10}alkenylene, C_{2-10}alkynylene, or a direct bond wherein the alkylene, alkenylene and alkynylene chains are optionally substituted by hydroxy, C_{1-4}alkoxy or amino;

R_3 is selected from hydrogen, hydroxy, C_{1-6}alkoxy, C_{1-6}alkanoyl, C_{1-6}alkanoyloxy, C_{1-6}alkanoylamino, C_{1-6}alkoxycarbonyl, aryl, aryloxy, arylcarbonyl, arylC_{1-4}alkyl, arylC_{1-4}alkoxy, arylC_{1-4}alkanoyl, aryloxycarbonyl, arylC_{1-4}alkoxycarbonyl, arylamino, diarylamino, arylsulphonyl, heteroaryl, heteroaryloxy, heteroarylC_{1-4}alkoxy, heteroarylcarbonyl, heteroarylC_{1-4}alkanoyl, heteroaryloxycarbonyl, heteroarylC_{1-4}alkoxycarbonyl, heteroarylC_{1-4}alkyl, heteroarylamino, heteroarylsulphonyl, diheteroarylamino, heterocyclyl, heterocyclyloxy, heterocyclylC_{1-4}alkoxy, heterocyclylcarbonyl, heterocyclylC_{1-4}alkanoyl, heterocyclyloxycarbonyl, heterocyclylC_{1-4}alkoxycarbonyl, heterocyclylC_{1-4}alkyl, heterocyclylamino, diheterocyclylamino, heterocyclylsulphonyl, carbocyclyl, carbocyclyloxy, carbocyclylC_{1-4}alkoxy, carbocyclylcarbonyl, carbocyclylC_{1-4}alkanoyl, carbocyclyloxycarbonyl, carbocyclylC_{1-4}alkoxycarbonyl, carbocyclylC_{1-4}alkyl, carbocyclylamino, carbocyclylsulphonyl, dicarbocyclylamino, cyano, carbamoyl, ureido, amino, *N*-C_{1-4}alkylamino, *N,N*-di-C_{1-4}alkylamino, C_{1-4}alkoxycarbonylamino, carbamoyl, *N*-C_{1-4}alkylcarbamoyl, *N,N*-di-C_{1-4}alkylcarbamoyl, C_{1-4}alkylsulphanyl, C_{1-4}alkylsulphinyl, C_{1-4}alkylsulphonyl, trifluoromethyl or fluoro wherein R_3 may be optionally substituted by up to three substituents independently selected from C_{1-4}alkyl, hydroxyC_{1-4}alkyl, C_{1-4}alkoxy, C_{1-6}alkoxycarbonyl, C_{2-6}alkenyloxycarbonyl, C_{1-4}alkanoyl, C_{1-4}alkanoylamino, C_{1-4}alkanoylthio, oxo, carboxy, hydroxy, halo, cyano, amino, *N*-C_{1-4}alkylamino, *N,N*-di-C_{1-4}alkylamino, *N*-C_{1-4}alkylaminoC$_{1-4}$alkyl, *N,N*-di-C_{1-4}alkylaminoC$_{1-4}$alkyl, carbamoyl, *N*-C_{1-4}alkylcarbamoyl, *N,N*-di-C_{1-4}alkylcarbamoyl, mercapto, C_{1-4}alkylsulphonyl, C_{1-4}alkylsulphinyl, C_{1-4}alkylsulphanyl, C_{1-4}alkylsulphonyloxyC_{1-4}alkyl, nitro, trifluoromethyl, trifluoromethylC_{1-4}alkyl, C_{1-6}alkoxycarbonylamino, C_{1-6}alkoxycarbonyl(N-C_{1-4}alkyl)amino, aryl (optionally substituted by one C_{1-4}alkoxy or sulphamoyl), arylC_{1-4}alkyl, aryloxyC_{1-4}alkyl, arylcarbonyl, heteroaryl, heteroarylC_{1-4}alkyl, heteroaryloxyC_{1-4}alkyl, heteroarylcarbonyl, heterocyclyl, heterocyclylC_{1-4}alkyl, heterocyclyloxyC_{1-4}alkyl, heterocyclylcarbonyl, carbocyclyl, carbocyclylC_{1-4}alkyl, carbocyclyloxyC_{1-4}alkyl or carbocyclylcarbonyl; and

R_4 is selected from hydrogen, C_{1-4}alkyl, halo or nitro;

or a pharmaceutically acceptable salt, prodrug or solvate thereof.

2. The use of a compound of formula **(I)** according to claim 1 or a pharmaceutically acceptable salt, prodrug or solvate thereof wherein R_1 is selected from hydrogen, C_{1-6}alkyl, C_{1-6}alkanoyl, aryl, arylcarbonyl, heterocyclylC_{1-4}alkyl, C_{1-4}alkylsulphonyl or *N,N*-di-C_{1-4}alkylaminosulphonyl wherein R_1 may be optionally substituted (on an available carbon atom) by up to three substituents independently selected from halo or heteroarylC_{1-4}alkanoylamino.

3. The use of a compound of formula **(I)** according to claim 1 or claim 2 or a pharmaceutically acceptable salt, prodrug or solvate thereof wherein R_2 is selected from hydrogen, C_{1-4}alkyl (optionally substituted by hydroxy), cyano or halo.

4. The use of a compound of formula **(I)** according to any one of claims 1-3 or a pharmaceutically acceptable salt, prodrug or solvate thereof wherein the group -A-B-R_3 is selected from *N'*-(2-*N',N'*-dimethylaminoethyl)-*N'*-methylureido, *N'*-(3-*N',N'*-dimethylaminopropyl)-*N'*-methylureido, *N'*-methyl-*N'*-pyrid-2-ylethylureido, *N'*-acetamidoethylureido, *N'*-1-phenyleth-1-ylureido, *N'*-(1-methylpyrrolidin-2-ylethyl)ureido, *N'*-methyl-*N'*-pyrid-4-ylethylureido, morpholinocarbonylamino, 4-*N,N*-dimethylaminomethylpiperidin-1-ylcarbonylamino, 4-morpholinocarbonylpiperidin-1-ylcarbonylamino, amino, 6-carbamoylpyridazin-3-ylamino, 6-(pyrid-4-yl)pyridazin-3-ylamino, isopropylcarbonylamino, 2-pyrid-4-ylethenylcarbonylamino, 2-oxotetrahydrothiazol-4-ylcarbonylamino, 1,2,4-triazol-1-ylmethylcarbonylamino, 2-oxopyrrolidin-1-ylmethylcarbonylamino, imidazol-1-ylethylcarbonylamino, 2-(3-bromoisoxazol-5-yl)ethylcarbonylamino or isothiazol-5-ylcarbonylamino.

5. The use of a compound of formula **(I)** according to any one of claims 1-4 or a pharmaceutically acceptable salt, prodrug or solvate thereof wherein R_4 is selected from hydrogen, C_{1-4}alkyl, or nitro.

6. A compound of formula **(I)** according to any one of claims 1-5 which is: 9-isopropyl-3-(6-carbamoylpyridazin-3-ylamino)carbazole;

9-ethyl-3-(6-carbamoylpyridazin-3-ylamino)carbazole;

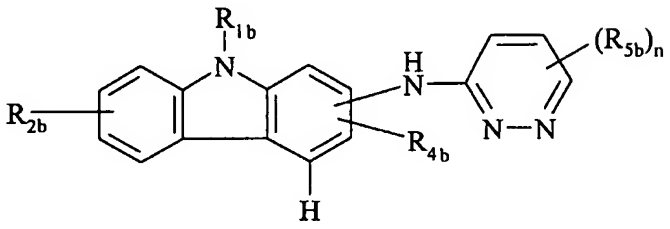
9-isopropyl-3-(morpholinocarbonylamino)carbazole;

9-ethyl-3-(morpholinocarbonylamino)carbazole;

9-ethyl-3-(1,2,4-triazil-1-ylmethylcarbonylamino)carbazole;

or a pharmaceutically acceptable salt, prodrug or solvate thereof.

7. A compound of formula **(Ib)**:



(Ib)

wherein:

$\mathbf{R_{1b}}$ is selected from hydrogen, C_{1-6}alkyl, C_{1-4}alkoxyC_{1-4}alkyl, C_{1-6}alkanoyl, C_{1-4}alkanoylC_{1-4}alkyl, aryl, arylC_{1-4}alkyl, arylC_{1-4}alkoxyC_{1-4}alkyl, arylC_{1-4}alkanoyl, arylcarbonyl, heteroaryl, heteroarylC_{1-4}alkyl, heteroarylC_{1-4}alkoxyC_{1-4}alkyl, heteroarylC_{1-4}alkanoyl, heteroarylcarbonyl, heterocyclyl, heterocyclylC_{1-4}alkyl, heterocyclylC_{1-4}alkoxyC_{1-4}alkyl, heterocyclylC_{1-4}alkanoyl, heterocyclylcarbonyl, carbocyclyl, carbocyclylC_{1-4}alkyl, carbocyclylC_{1-4}alkoxyC_{1-4}alkyl, carbocyclylC_{1-4}alkanoyl, carbocyclylcarbonyl, C_{1-4}alkylsulphonyl, *N,N*-di-C_{1-4}alkylaminosulphonyl or *N*-C_{1-4}alkylaminosulphonyl wherein R_{1b} may be optionally substituted (on an available carbon atom) by up to three substituents independently selected from C_{1-4}alkyl optionally substituted by up to three fluoro substituents, C_{1-4}alkoxy, C_{1-4}alkanoyl, carboxy, hydroxy, halo, cyano, amino, *N*-C_{1-4}alkylamino, *N,N*-di-C_{1-4}alkylamino, C_{1-4}alkanoylamino, mercapto, C_{1-4}alkylsulphonyl, C_{1-4}alkylsulphinyl, C_{1-4}alkylsulphanyl, nitro, heteroarylC_{1-4}alkanoylamino, or C_{1-4}alkoxycarbonyl;

$\mathbf{R_{2b}}$ is selected from hydrogen, C_{1-4}alkyl (optionally substituted by hydroxy), C_{1-4}alkoxy, cyano, nitro, halo, amino, *N*-C_{1-4}alkylamino, or *N,N*-di-C_{1-4}alkylamino;

$\mathbf{R_{4b}}$ is selected from hydrogen, C_{1-4}alkyl, halo or nitro;

$\mathbf{R_{5b}}$ is selected from C_{1-4}alkyl, hydroxyC_{1-4}alkyl, C_{1-4}alkoxy, C_{1-6}alkoxycarbonyl, C_{2-6}alkenyloxycarbonyl, C_{1-4}alkanoyl, C_{1-4}alkanoylamino, C_{1-4}alkanoylthio, oxo, carboxy,

hydroxy, halo, cyano, amino, *N*-C_{1-4}alkylamino, *N,N*-di-C_{1-4}alkylamino, *N*-C_{1-4}alkylaminoC$_{1-4}$alkyl, *N,N*-di-C_{1-4}alkylaminoC$_{1-4}$alkyl, carbamoyl, *N*-C_{1-4}alkylcarbamoyl, *N,N*-di-C_{1-4}alkylcarbamoyl, mercapto, C_{1-4}alkylsulphonyl, C_{1-4}alkylsulphinyl, C_{1-4}alkylsulphanyl, C_{1-4}alkylsulphonyloxyC$_{1-4}$alkyl, nitro, trifluoromethyl, trifluoromethylC$_{1-4}$alkyl, C_{1-6}alkoxycarbonylamino, C_{1-6}alkoxycarbonyl(*N*-C_{1-4}alkyl)amino, aryl (optionally substituted by one C_{1-4}alkoxy or sulphamoyl), arylC$_{1-4}$alkyl, aryloxyC$_{1-4}$alkyl, arylcarbonyl, heteroaryl, heteroarylC$_{1-4}$alkyl, heteroaryloxyC$_{1-4}$alkyl, heteroarylcarbonyl, heterocyclyl, heterocyclylC$_{1-4}$alkyl, heterocyclyloxyC$_{1-4}$alkyl, heterocyclylcarbonyl, carbocyclyl, carbocyclylC$_{1-4}$alkyl, carbocyclyloxyC$_{1-4}$alkyl or carbocyclylcarbonyl; and

n is 0-3; wherein the values of R_{5b} may be the same or different;

or a pharmaceutically acceptable salt, prodrug or solvate thereof.

8. The use of a compound of formula **(I)** or **(Ib)** according to any one of claims 1-7 or a pharmaceutically acceptable salt, prodrug or solvate thereof in the manufacture of a medicament for the treatment of eating disorders in a warm-blooded animal.

9. A method of treatment, in a warm-blooded animal, of eating disorders, comprising administering a therapeutically effective amount of a compound of formula **(I)** or **(Ib)** according to any one of claims 1-7, or a pharmaceutically acceptable salt, prodrug or solvate thereof.

10. A pharmaceutical composition comprising a compound of formula **(I)** or **(Ib)** according to any one of claims 1-7, or a pharmaceutically acceptable salt, prodrug or solvate thereof, in admixture with a pharmaceutically acceptable diluent or carrier for use in promoting weight loss.

INTERNATIONAL SEARCH REPORT

Interr al Application No
PCT/GB 00/02745

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 C07D209/88 A61K31/403 A61P3/04 C07D401/12 C07D413/12
C07D403/12 C07D405/12 C07D521/00 C07D417/12 C07D409/12
C07D403/14 C07D401/14

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 C07D A61K A61P

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
CHEM ABS Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 98 35944 A (BAYER CORPORATION) 20 August 1998 (1998-08-20) * page 36, composition 130 and 131; claim 1 *	1,8
A	WO 98 35957 A (BAYER CORPORATION) 20 August 1998 (1998-08-20) * compound 306, 307, 308, 310, 311, 325; claim 1 *	1,8

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

° Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

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"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
13 November 2000	24/11/2000

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL – 2280 HV Rijswijk Tel. (+31–70) 340–2040, Tx. 31 651 epo nl, Fax: (+31–70) 340–3016	Van Bijlen, H

Form PCT/ISA/210 (second sheet) (July 1992)

INTERNATIONAL SEARCH REPORT

Information on patent family members

Inten al Application No
PCT/GB 00/02745

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 9835944 A	20-08-1998	AU 6267198 A	08-09-1998
		CA 2251580 A	20-08-1998
		EP 0927166 A	07-07-1999
WO 9835957 A	20-08-1998	AU 6144098 A	08-09-1998
		CA 2251368 A	20-08-1998
		EP 0910565 A	28-04-1999
		US 5939462 A	17-08-1999